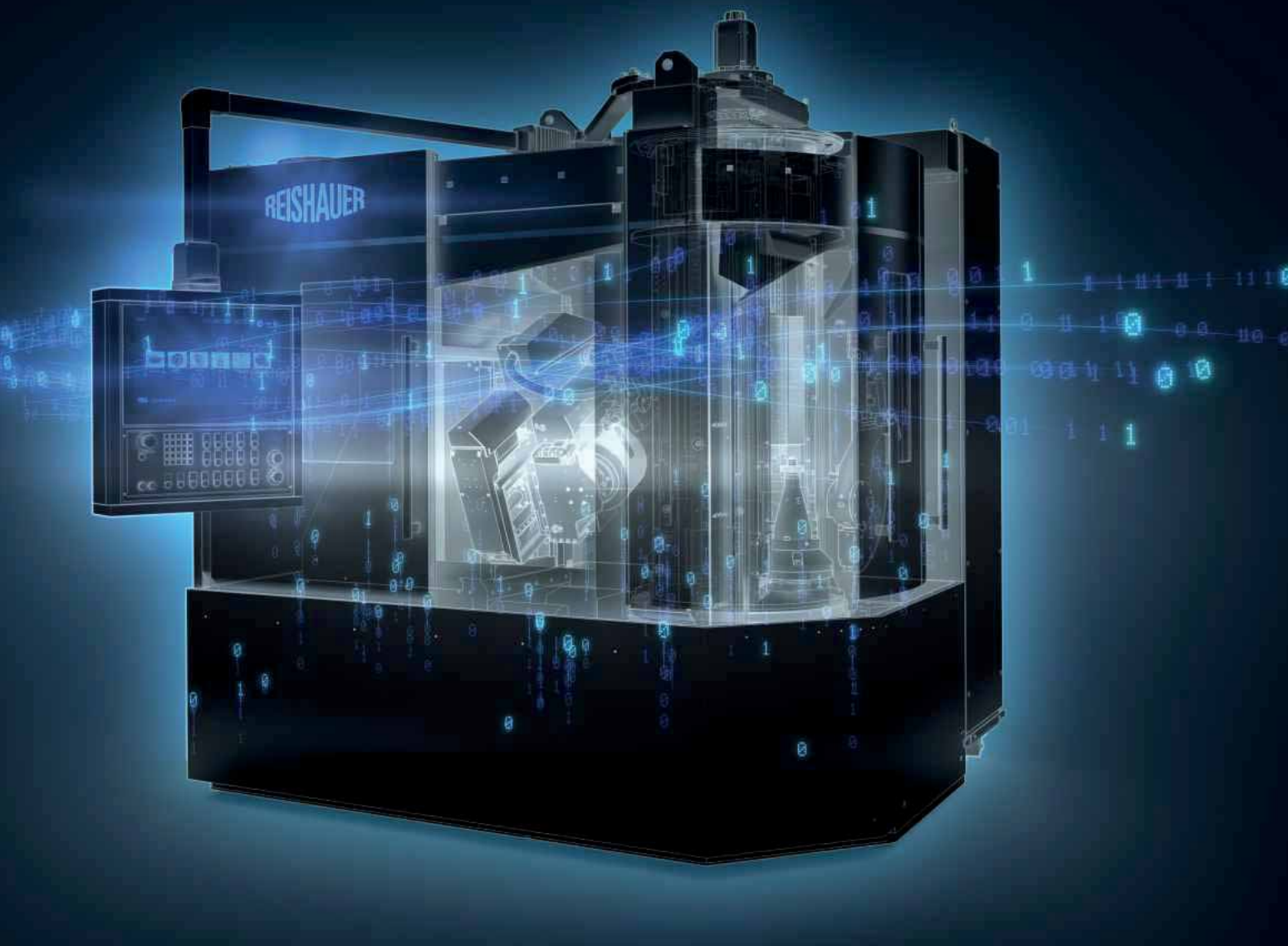




## 20% enhanced surface finish

with combined technology hydrostatic and linear motor on GrindSmart®830XW





# GENERATING GEAR GRINDING MADE TRANSPARENT

## Process monitoring

The dressing and grinding intensities are measured and monitored by smart real-time data processing and tested algorithms. For each workpiece, all data generated during dressing and grinding are recorded and stored in a database and remain 100% traceable. Using the stored process and tooling data, including workpiece identification via DMC, offers the means of comprehensive analysis. Due to process interaction, and using preset evaluation limits, workpieces that exceed or fall short of these limits are automatically removed.

## Component monitoring

Recurring automatic testing cycles measure and evaluate all the relevant grinding machine axes involved in the process, and thus enables early detection of electromechanical deviations. Maintenance costs are optimized both in terms of planning and diagnosis, and some potential EOL anomalies may be avoided.



# GRINDING & SURFACE FINISHING

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## 20 percent enhanced surface finish

The GrindSmart® 830XW integrates the innovative combination of hydrostatic technology and linear motors to produce large and small series with six axes interpolated simultaneously. This concept provides an exceptionally high degree of rigidity and dampens vibrations that naturally occur during grinding, thereby increasing the life of the grinding wheels and guaranteeing surface finishes and sharp cutting edges that give users a real competitive advantage. Unattended production is an additional process that has been integrated into this machine to allow long-term manufacturing without human intervention.



Features include:

- Constant grinding point for relief operations on ball nose, radii and form tools
- Maximum freedom in axis movements due to the 6-axis design and the total symmetry of the spindle axis (A)
- Capacity of 10 cassettes for up to 4,500 pieces
- Wheel pack and nozzle change under 11 seconds
- Tool unload/load simultaneously during wheel change
- Mirror surface finish
- Perfectly sharp cutting edges
- Radius shape accuracy below 0.003 mm
- Repeatability in production below 0.01 mm
- In-process tool measuring system
- Full software package included
- Free upgrades during the entire machine lifetime

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# Riley Surface World supplies critical machinery to VentilatorChallengeUK

## VENTILATOR CHALLENGE | UK

Rileys Surface World is proud to have supported the VentilatorChallengeUK Consortium with the delivery of two machines critical to the manufacture of ventilators for the fight against Covid-19.

Rolls-Royce Plc and GKN Aerospace each have a Kerry Microsolve 250M Ultrasonic Cleaning Machine delivered to their design and manufacturing plants in Filton (Bristol, UK) and Cowes (Isle of Wight, UK), supplied by Riley Surface World.

These quality machines use ultrasonic frequencies to clean parts to a very high specification, essential to parts used in the manufacture of ventilators for medical use.

Many of the consortium members are long term customers and the trust earned by Rileys Surface World has played a significant role in ensuring rapid delivery of these machines.

"We really appreciate all the stops you've pulled out for us on this," says Martin Williams, chief industrialisation engineer, Rolls-Royce UK.

"I couldn't be happier. This will make a world of difference to our production flow," says Glyn Lavell ChPP| programme manager, GKN Aerospace UK.

The supply of these machines demonstrates the strength of Riley's team even in these difficult times.

The first used Kerry 250M was available from stock in Riley's 5,000 m<sup>2</sup> warehouse, having been bought from Thales UK in January to ensure availability of these popular machines.

This machine has been supplied refurbished by Riley's in-house engineering team in conjunction with long term partner CRV controls. A range of critical spares, commissioning and training is also being supplied alongside the guarantee to confirm Riley's commitment to supporting the consortium and the NHS.

The second used Kerry 250M machine was sourced from Riley's industry network as soon as a need was identified across the VentilatorChallengeUK Consortium. Once found, Riley's moved quickly to place the

The consortium has come together to produce medical ventilators for the UK. The UK Government has placed orders for ventilators to be delivered as soon as possible and the consortium is making rapid progress.

Ventilators are essential to the NHS and the consortium is supporting existing suppliers to expand production and adding new Rapidly Manufactured Ventilator Systems to the supply chain.

Riley Surface World was established in 1968. It has developed from a traditional machinery merchant into a global marketing



machine with GKN Aerospace over just one weekend.

Riley Surface World thanks its key partners in recognising the importance of these machines and supporting their rapid delivery. CRV Controls has provided engineering support and on-site commissioning and training. The hauliers have also been excellent support responding same day because of the speed of delivery of this project.

The VentilatorChallengeUK consortium includes leading UK industrial, technology and engineering businesses from across the aerospace, automotive and medical sectors such as Airbus, BAE, Ford, GKN, Rolls-Royce, Thales and McLaren F1.

platform for the surface finishing industry. It has a huge range of new and used plant and machinery in stock and online, and provides technical consultancy, factory clearances, decommissioning, online auctions and a wide range of asset realisation services to companies worldwide.

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**Email: [info@rileysurfaceworld.co.uk](mailto:info@rileysurfaceworld.co.uk)**

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# New, high value universal grinder from Kellenberger

A new universal cylindrical grinding machine from Swiss specialist Kellenberger majors on providing excellent value at the entry level while offering reliability, precision and high productivity via its state-of-the-art intuitive programming function.

The Kellenberger 10 (K10) combines proven technology using many Kellenberger components and sub-assemblies from the established K100 machine coupled with the latest programming technology. This uses the Kellenberger Blue teach/programming software that enables semi-skilled operators to use the machine, thereby optimising use of the work team.

The standard machine can accommodate workpieces up to 1,000 x 400 mm in size with a top table weight capacity of 100 kg. The table profile is also a proven Kellenberger design with the full-length wheel dressing interface located on its rear to reduce retooling work and extend the wheel dressing possibilities.

The machine features generous X- and Z-axis strokes (X=365 mm / Z=1,150 mm), collision-free operation and dressing ratios. The low-maintenance, high-precision linear guide on the X-axis and the V flat sliding guides on the Z-axis are equipped with optical absolute linear position measuring systems. The B-axis is designed as an automatic indexing axis (1° Hirth gearing) with high positioning accuracy and a +30°/-210° swivel range.

The K10 also offers the ability for users to greatly expand or customise its capability by adding a range of optional equipment such as a second external grinding wheel, larger grinding wheels, a tailstock, gap control and

balance sensors and measurement control via probing.

It features an extremely stable sub-frame to minimise external influences and vibration which can adversely affect surface finish, all-round component quality and sustained process accuracy.

The Kellenberger BLUE solution software is accessed through a Fanuc Oi-TFP CNC control with a 19" touch screen. Programming, retooling and a remote diagnostic feature extend the opportunities for using the machine on a wide variety of applications across the machine shop. The operator does not need DIN or ISO skills.

For optimum productivity and flexibility, the universal grinding head can optionally be equipped with two 500/400 mm Ø O.D. grinding wheels. Powerful high-frequency, grease-lubricated I.D. grinding spindles with direct drive are available in two speed ranges (6,000-40,000 rpm and 10,000-60,000 rpm).

The machine brings all of the proven design, assembly and reliability features associated with the Kellenberger brand to a much wider market via its highly competitive pricing structure.

Hardinge, Inc. is the trusted global provider of high precision, computer-controlled machine tool solutions for critical, hard-to-machine metal parts and advanced workholding accessories. With over 125 years of experience, Hardinge offers the largest variety of metalcutting turning

machines, grinding machines, machining centres, collets, chucks, index fixtures, repair parts, standard and specialty workholding devices, plus other machine tool accessories. Hardinge's solutions can be found in a broad base of industries including aerospace, agricultural, automotive, construction, consumer products, defense, energy, medical, technology, and transportation.



As featured the K10 can be fitted with a second external grinding wheel

Headquartered in Berwyn, PA, the company designs, manufactures, and distributes machine tools in over 65 countries across North America, Europe, and Asia.

## Quick and cheap - from drawing to ground workpiece

Offering excellent value for money, the newly developed universal cylindrical grinding machine Kellenberger 10 is a standard machine that can be customised with a wide range of options. Optimised for costs and throughput time, this energy-efficient machine is ideal for beginners and experienced operators alike. Alongside the Kellenberger 100 and Kellenberger 1000 concepts already established on the market, the K10 is a further example of top quality from Kellenberger in the cylindrical grinding sector. With a distance between centres of 1,000 mm and a centre height of 200 mm, the machine covers a wide range of parts. High availability, process safety, reliability, productivity and flexibility, as well as easy retooling are the hallmarks of this machine.

The K10 is designed as hooked machine. Its base is mechanically extremely stable to minimise external influences on the grinding result. The proven continuous Kellenberger table profile for the standard assemblies and optional add-ons is ideally designed. The full-length dressing interface on the rear side of the table reduces retooling work and extends the dressing possibilities.

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**[www.dfpmach.com](http://www.dfpmach.com)**



The K10 features high quality build standards with the ability to add a range of options

# THE ART OF GRINDING.

BECAUSE QUALITY COMES FROM SOLID CRAFTSMANSHIP.



Fritz Studer AG, established in 1912, is a market and technology leader in universal, external and internal cylindrical grinding as well as noncircular grinding. With around 24,000 delivered systems, STUDER has been synonymous with precision, quality and durability for decades.

[studer.com](https://www.studer.com)





# Continuous generating grinding of asymmetric gears

Today, transmission developments aim at increasing power density, reducing gear noise, and improving energy efficiency.

The increase of power density translates into a boost of the power transfer while maintaining or even decreasing the available installation space. This economy of space makes weight reduction possible. Improving energy efficiency reduces the power loss in transmissions and converts directly into a CO<sub>2</sub> emission reduction.

In the real world, gear teeth are rarely subjected to equal loads on both the drive and the coast flanks. If one of the tooth flanks is subjected to higher forces in the direction of the applied torque, the tooth meshing can be optimised by using an asymmetrical tooth flank geometry. Typical examples of a preferred direction of applied torque are:

- Tractors: the maximum torque load works in one direction only.
- Wind turbine gearboxes: the wind load and breaking torque apply on the same gear flanks.
- Crane transmission: the weight load always applies in the same direction.

Asymmetrical gears can be easily manufactured by the discontinuous profile grinding method. This method, however, is slow, and economically speaking, makes only sense for low volume production of high-value components such as wind generation gears. Nevertheless, today, automotive gears can also benefit from an asymmetrical design. Automotive gears are subject to enormous economic constraints. They must be manufactured both in high volume and at low costs, for which discontinuous profile grinding is not a viable option.

Reishauer's continuous generating grinding process represents the industry standard for the manufacture of symmetrical automotive gears at high volume, high quality, and at low unit costs.

Based on a dressable threaded grinding wheel, and a twin-spindle concept, this process has proven itself, both in terms of flexibility and high productivity.

In principle, the kinematics of this process is comparable to a worm drive, with additional abrasive machining movements consisting of an infeed X, a vertical feed-rate Z and a lateral shifting motion Y. This principle applies equally to symmetrical and asymmetrical gears. The difference is the profile of the threaded wheel, which requires, of course, also an asymmetrical profile, as shown in Illustration 3.

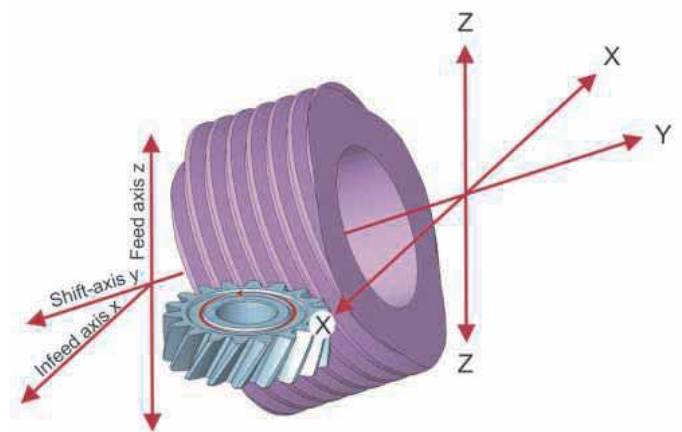


Illustration 2: Kinematics of the continuous generating process

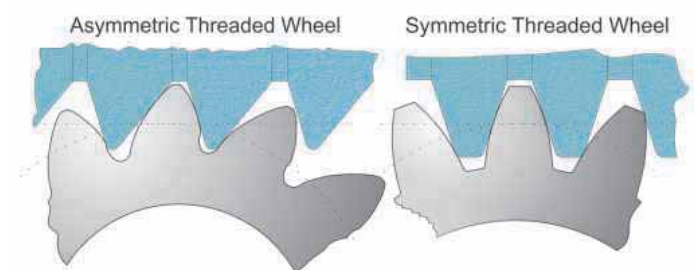


Illustration 3: Asymmetrical and symmetrical grinding wheel profiles

Today, the continuous generating grinding principle also applies to the grinding of asymmetrical gear flanks, with the process now being as efficient and economical as the grinding of symmetrical gears. Furthermore, the Reishauer continuous process allows a subsequent polish grinding stroke in the same clamping operation if a two-zone grinding and polishing threaded wheel is used. Dedicated diamond dressing rolls with asymmetrical profiles achieve the same efficiency and economy as known for symmetrical gear grinding. Illustration 4 shows the appropriate dressing tool for dressing vitrified threaded grinding wheels. Furthermore, the diamond rolls can dress the grinding and polishing section of the threaded wheel in the same dressing operation.



Reishauer RZ 260 twin-spindle generating gear grinder



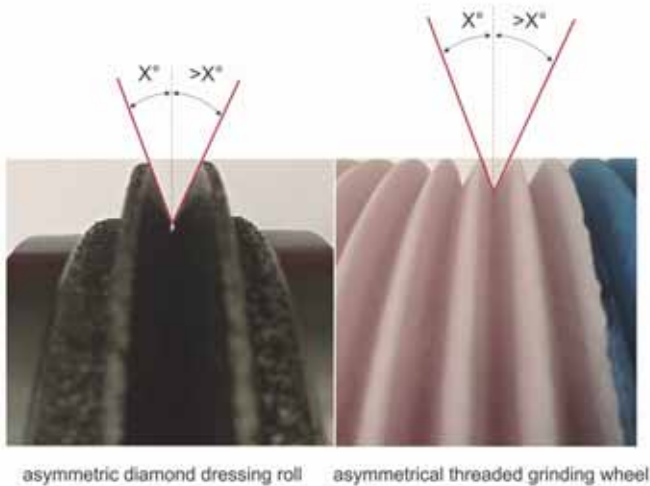


Illustration 4: Diamond dressing roll and threaded grinding and polishing wheel

Additionally, the automatic gear meshing, which aligns gears into the correct grinding position, required additional development work to ensure fast and reliable workpiece meshing and changing cycles. In asymmetrical gears, the left and right pressure angles of the individual gear tooth are different. For this reason, the depths of grinding cuts are different for both flanks at an equal radial infeed. Hence, a continuous adjustment of the axes synchronisation via the machine's CNC control is necessary to maintain an equal grinding depth on both flanks.

### Why use asymmetrical pressure angles?

The asymmetrical design of gear flanks serves to increase the load capacity of the gear flank and the gear root. As shown in Illustration 5, an increase of the pressure angle leads to a rise of the curvature radii on the gear flank as the base cylinder is decreased (point B moves towards the outside). Increasing the pressure angle also leads to a strengthening of the root load capacity. This lowers the bending load as it reduces the bending moment lever arm (point D moves downwards). Moreover, increasing the pressure angle enlarges the tooth root cross-section  $S_F$ , which renders the gear tooth root more "robust."

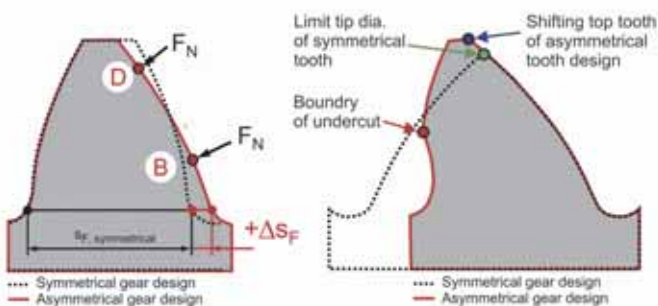


Illustration 5: Features of asymmetrical tooth shapes

$F_N$  Normal force on the tooth

B Inner singular contact point (relevant for the contact stress/flank load carrying capacity according to ISO 6336)

D Outer singular contact point (relevant for root bending stress acc. to ISO 6336)

$S_F$  Critical cross-section of gear tooth root acc. to ISO 6336

There are many benefits for increasing the pressure angle, with the only limitation being that the boundary line of the undercut shifts towards the tip of the tooth. By shifting the tooth top limit of an asymmetrical tooth design, the following options become available:

- Increasing the tooth-bearing load capacity
- Increasing the contact ratio
- Reducing contact stress
- Reducing noise excitations (NVH)
- Enlarging the tooth thickness at the tip diameter
- Reducing the danger of tooth top breakage caused by through-hardened tooth tips

The following gear chart, Illustration 6, shows the results of an asymmetrical automotive ring gear, polish ground with the following gear data:  $\approx 60$  teeth, module  $\approx 2.8$ , pressure angle  $\approx 30.5^\circ/16.5^\circ$ .

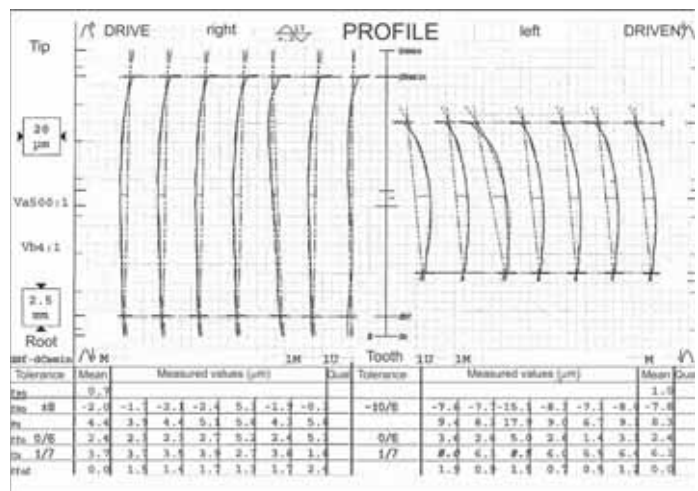


Illustration 6: Gear chart of ring gear profile

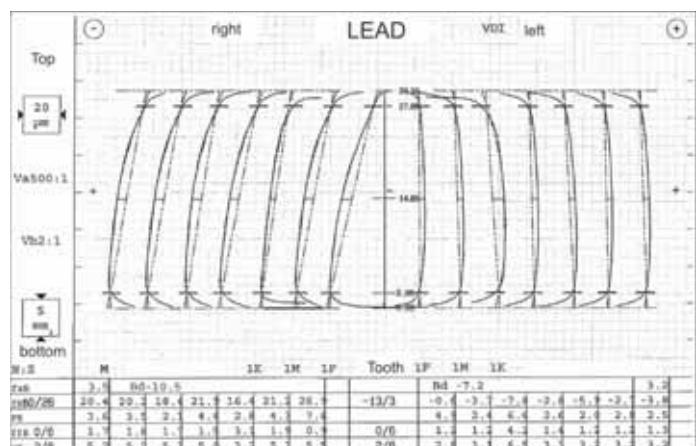


Illustration 7: Gear chart of ring gear profile

### Conclusion

The new Reishauer machines are ready for the grinding of automotive asymmetrical gears and are used actively for projects of OEMs. The whole machine concept is very user-friendly as data input, and the operation of asymmetrical gear grinding are as easy to use as for standard symmetrical gears.

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# KAPP NILES Metrology acquires metrotek software rights

With effect from 1st April, KAPP NILES Metrology GmbH has acquired all rights to the software, including source code, from metrotek GmbH in Karlsruhe. The employees at the Karlsruhe location were successfully integrated into the KAPP NILES Metrology team.

The evaluation software is the central element of a gear measuring machine in addition to the high-precision mechanics and control technology. The consistent development of the globally proven evaluation software ensures the company a further competitive advantage. This strategic measure strengthens the market position of KAPP NILES Metrology.

The company offers stationary and mobile measuring machines, measuring instruments and special measuring equipment.

The stationary machines can be used to measure gears, gear cutting tools and rotationally symmetrical components from 6 mm up to 6,000 mm gear diameter. The portable machines allow measurements of unlimited component size:

## KNM 2X / 5X / 9X series - measuring machines for small and medium-sized workpieces up to 1,250 mm

The KNM 2X / 5X / 9X analytical measuring machines are designed for high-precision measurements of gears, gear tools and rotationally symmetric workpieces. All guides and base plates made of granite are extremely stable in the long-term and have identically low expansion coefficients. Air



bearings with emergency operation properties ensure perfect and wear-free guides without short-term errors. Air spring elements underneath the base plates safely shield from jolts and vibrations. Special bases are not required. Non-ferrous linear and torque motors of the rotary tables ensure ultimate position precisions and path accuracy. Despite the compact design, spacious travel ranges ensure a tangential generating motion towards the base circle for any profile. Based on the requirements, different scanning touch probe systems can be used. The control cabinet can be arranged freely.

## KNM X series - measuring machines for large workpieces up to 6,000 mm

According to customer-specific requirements, the KNM X series can be either designed as a stationary machine for medium and larger sized gears, or as a docking station. For this purpose, any size of the machine base can be combined with a rotary table and a transportable three axes

measuring device. The KNM X machines boast high-precision mechanics with optimal accessibility, laser-based safety equipment, large bearing clearances and generously dimensioned guiding cross-sections. Linear motors are used in all linear axes. High-precision rotary tables with air or hydrostatic bearing (diameter of 500 to 1,800 mm) feature direct drives/ through-holes. Controlled air spring elements underneath the base plates safely shield from jolts and vibrations. No special foundations are required. The use of drives close to the centre of gravity ensures a low level of dynamic distortions.

## KNM C series - measuring machines for complex workpieces

The machine has been optimally adapted for the determination of geometrical errors at bearing rings, slewing rings and cylinder-shaped workpieces. The



CNC-controlled 4-axis structure allows for the expansion to a significantly larger component range, such as gears or 3D-measurement tasks on prismatic workpieces. All machines of the KNM C series are equipped with state-of-the-art drive technology (linear motors), and feature generously dimensioned guiding cross-sections and large bearing clearances. The base plate, vertical columns and axes are made of granite. This ensures stable thermal behaviour. Air spring elements underneath the base plate safely shield from jolts and vibrations. The raised Y-guide and a drive close to the centre of gravity reduce the dynamic distortions to a minimum. Measurement uncertainties are at





MPEE  $\geq 0.6 \mu\text{m} + L/400$  | MPETHP  $\geq 0.8 \mu\text{m}$ .  
Reliable software is available for fully automated measurement cycles.

## KNM P series - portable measuring machines for gears and diverse components

The equipment in the KNM P series has been optimally adapted directly to the production machine according to the specific customer requirements regarding the autonomous measurement of gears, ring-shaped workpieces such as bearing rings, housings etc. The combination of base plate and rotary table in a customised design (docking station) forms a full-featured 4-axis measuring device. Measurements can even be carried out without rotary table directly in the workshop area. In the KNM P machines, specially designed high-precision mechanics add to optimal accessibility with state-of-the-art drive technology (linear motors). The CNC-controlled 3-axis structure allows for checking all gear parameters or general workpiece profiles. Arbitrary workpiece diameters and easy transport are especially worth emphasising. The measuring



equipment is placed on a sturdy base connected directly to the production machine or foundation.

KAPP NILES Metrology GmbH has been firmly integrated into the KAPP NILES group of companies for three years. With the Metrology product division, the product portfolio of grinding machines, grinding and

dressing tools as well as complex technology consulting has been comprehensively expanded.

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## Discover the new standard in helical gear manufacturing

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Discover the Holroyd GT350, our latest technology for the production of ultra-precise gears and threads of up to 350 mm in diameter.

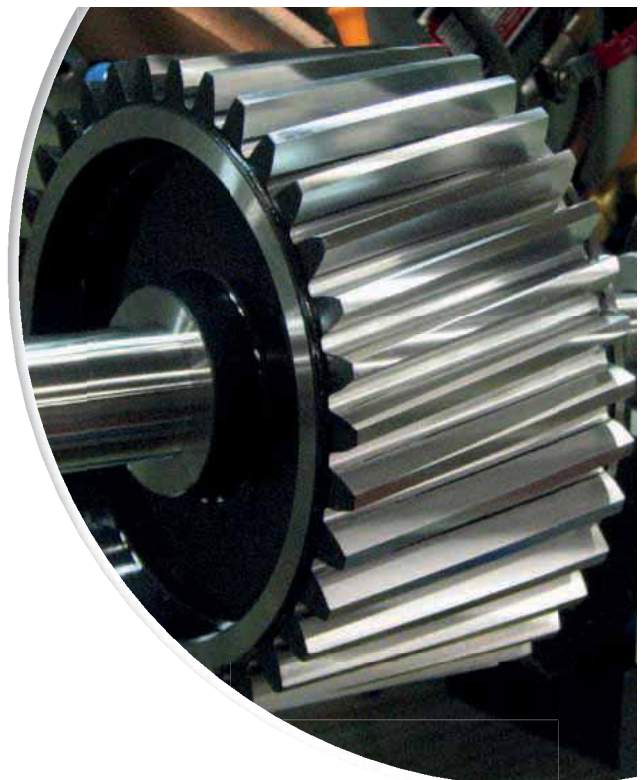
- Designed for prototyping, batch and volume grinding
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**ABSOLUTE PRECISION MAKES ALL THE DIFFERENCE**

## Performing productions

by Claudio Tacchella

The grinding solutions offered by Ghiringhelli are able to satisfy even the most exacting requests of the most dynamic customers as those belonging to the automotive Industry.

The automotive industry has always been recognized as the most dynamic sector, geared towards technological innovation, and among the most careful and demanding in the requests of production technologies. The quest for increasingly smart and performing vehicles is moreover followed by the developments on diversifications among cars equipped with internal combustion engines, hybrid and fully electric ones. However the sector is also going through turmoil and downturn on the market, mainly caused by the uncertainty of the future of the internal combustion engine, and more generally of mobility itself, with a consequent negative impact on the investments of the entire manufacturing sector. Automotive is traditionally the "core business" sector of centerless grinding machines manufactured by Ghiringhelli and the world market recognizes the company as one of the leading manufacturers of these types of machines, due to high-tech and high-performing solutions capable of



Not only machines, but real customized grinding systems with integrated performing automations

satisfying the most strict production requests.

"Our company- explains Mr. Marco Barzaghi, Sales Manager of the Rettificatrici Ghiringhelli -, has always tried to diversify the request and the sectors to which the centerless grinding machines are to be used. This strategy proves rewarding. In

particular today that - with the contraction in the production of vehicles with internal combustion engines - our grinding solutions are balanced towards the industries manufacturing electric motors. Our approach to meet the most modern grinding demand takes place with a renewed range of machines and subsystems with a modular and flexible concept, with the efficient integration of automations. This allows us to give targeted and dedicated responses to specific customer needs. In addition customization changes all our products into real unique creations of their kind, with "turnkey solutions" that meet the requirements of the strict specifications, production processes, tools, equipments, consumables, service and required automations, as well as the compliance with safety and environmental regulations."

Ghiringhelli is present worldwide in the automotive sector, both directly at large high volume manufacturers and in subcontracting, for which it designs, manufactures and installs centerless grinding systems for the grinding of injection components (diesel and petrol), "shafts" and "bearings" of the turbocompressor unit, engine valves, torsion bars, stator shafts for electric motors, as well as those for the handling of the seats, "spools" for the gearbox, etc. In



The renewed range of APG models is the winning solution for high productivity applications



the wide range of the Ghiringhelli solutions, the renowned and renewed range of APG models, which stands for High Precision Ghiringhelli, and pride of the company's production in Luino (VA), is the winning solution for high-productivity applications where high precision, flexibility, reliability and high reduction of the energy consumption are perfectly combined.

There is an interesting case study. An important group operating worldwide as primary supplier for the automotive sector (Tiers1), needed a solution that would allow them to cope with a marked production increase of motor shafts for the electric parking brakes, as they were mounted both on cars with internal combustion engines and on electric cars. In synergy with the customer, the Ghiringhelli engineers analyzed the production process of the customer and studied a new configuration according to the machine requested. Considering the size of the pieces to be ground, the solution provided was oriented by customizing a grinding machine, APG-M CNC6A, capable of grinding 3 pieces per cycle. The installed centerless grinding machine is a 6-axes CNC controlled system where the dressing of the grinding wheel (X/Y axes) and the control wheel (X1/Y1 axes) takes place with dressing groups with interpolated axes. The grinding wheel head has a support spindle on 3 hydrodynamic supports and allows the mounting of wheels

with max. diameter of 610 mm x 300 mm width, power up to 37 kW, constant peripheral speed up to 63 m/s and automatic wheel balancing. The two main working slides (V and Z axes) are overlapped and fitted with linear scales with resolution up to 1/10 micron. The control wheel head houses a spindle on double supports with high precise bearing units and mounts wheels with max. diameter of 355 mm x 305 mm width for couple of 11 Nm. The mineral casting frame gives rigidity and excellent material absorption, high thermal stability and perfect complete ecological balance. The CNC Siemens 840D SL integrates the exclusive software platform which belongs to Ghiringhelli and which is characterized by diagnostics, wheels-profiles libraries, cycle programming, statistical calculations for the value correction in cycle and predictive maintenance.

"In order to increase machine productivity, - comes to an end Mr. Marco Barzaghi -, we have carried out an in-depth research and development study on the best performing tools to be adopted, both in terms of cycle time and of impact on the wheels' dressing time. In addition, also for the machine control, we have developed a customized solution of automation by



Ghiringhelli is worldwide present in the automotive field, both directly at large high volume manufacturers and in subcontracting



The CNC Siemens 840D SL integrates the exclusive software platform which belongs to Ghiringhelli

integrating a feeder of in-bulk pieces with an orientation and storage station in 3 separate nests and a gantry type loader equipped with our own vacuum fingers for the introduction of the pieces into the machine."

All these factors greatly contributed to the efficiency of the entire supplied system which ensured both an increase in the machine autonomy and about 30% higher productivity, by consequently reducing the time required for plant control as well.

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The APG-M machine lends itself to integrate subsystems such as loaders and post-process measuring stations

# Holroyd brings new levels of intelligence to gear and worm tooth form manufacturing

Never content to rest on its laurels, UK-based Holroyd Precision has introduced a brand-new gear grinding centre that promises to bring even higher levels of intelligence and efficiency to the production of specialised gears and tooth forms. The GT350 is the latest machine from the Precision Technologies Group (PTG) company and retains many of the attributes that earned its predecessor, the GTG2, considerable acclaim.

Developed for one-off or batch grinding of precision spur and helical gears, as well as worms and screws of up to 350 mm in diameter, the GT350 can also precision grind compressor rotors. In essence a self-contained production cell, the GT350 achieves accuracies in the order of DIN 2 and features the high power necessary for deep grinding operations. A specially developed extended machine bed allows the machine to accommodate screws and worm shafts of up to one metre in length. Dedicated software compensates for helical twist and full topological capability comes as standard.

Such manufacturing capabilities are clearly significant. However, in this age of maximising efficiency, it is the focus that

Holroyd Precision has placed on perfecting the new machine's data collection and transfer capabilities while providing a choice of automation options that it believes will be of greatest interest to users. Indeed, with an enquiry about a GT350 gear grinding centre already received from a leading European producer of helical and spur tooth pinion gears, it looks as though Holroyd's latest precision gear grinder will be in demand.

"Ever since the Holroyd GT range of gear grinding centres was introduced in 2003, we have strived to revolutionise the production of specialist gear forms," comments Holroyd Precision's regional sales director, Steven Benn. "Our first-ever GT machine, for example, was widely acknowledged as one of the key reasons the company secured the Queen's Award to Industry: for innovation in the field of thread & gear grinding technology. That was in 2004. Today, in a world where production data is king, we have developed a machine that, through its ability to provide enhanced levels of information, will help customers achieve new levels of performance and efficiency."

### RFID scanning

Advanced RFID scanning, as first offered by Holroyd on its Zenith 400 helical profile grinding machine, is just one of the options that will assist GT350 users in achieving new levels of performance. Particularly valuable where machines are integrated into automated production cells, the company's RFID tagging process all but eliminates human error by helping ensure that chuck, collet, cutter and tailstock, in fact virtually any component or tooling item that needs to be switched between manufacturing cycles, is correctly changed for each gear grinding operation.

### IO-Link

From the earliest development stages, Holroyd partnered with leading automation specialists to enable it to offer IO-Link communication technology with all new GT350 machines. "IO-Link brings considerable opportunities for the collection and analysis of production data," says Steven Benn. "We chose IO-Link for its

ability to handle vast amounts of information, its capability for providing powerful opportunities for industrial automation and its capacity to communicate at every level of the manufacturing process. With IO-Link, Holroyd GT350 customers will benefit from incredible levels of rich, real-time production data, as well as being able to call upon historic production and performance records in order to make comparisons that will assist efficiency, accuracy and product quality. With production and machine data available immediately to desktop, tablet and mobile phone, we will provide customers with a wealth of information to help drive performance."

### Complex made simple

Holroyd has always taken great pride in developing machines that simplify even the most complex of manufacturing processes and the GT350 continues the trend. Incredibly sophisticated, yet exceptionally user friendly, the gear grinding centre combines extreme rigidity with high power for either CBN or conventional deep grinding operations. Setup is rapid for optimised productivity, while a highly intuitive user interface assists component production. Here, customers have the choice of either Siemens' 840D controller or Holroyd's advanced user-friendly in-house CNC and HMI system.

"The capabilities of the GT350 gear grinding centre are considerable," adds Steven Benn, "and can be attributed to a design that combines high levels of machine intelligence with on-board features such as automatic coordinate adjustment, in-cycle wheel dressing, integrated profile management and coordinate measurement. Additionally, all gear, worm and spline profiles can be verified using the integrated Renishaw probing system, enabling automatic on-machine corrections to be made if necessary."

### Compensating for helical twist

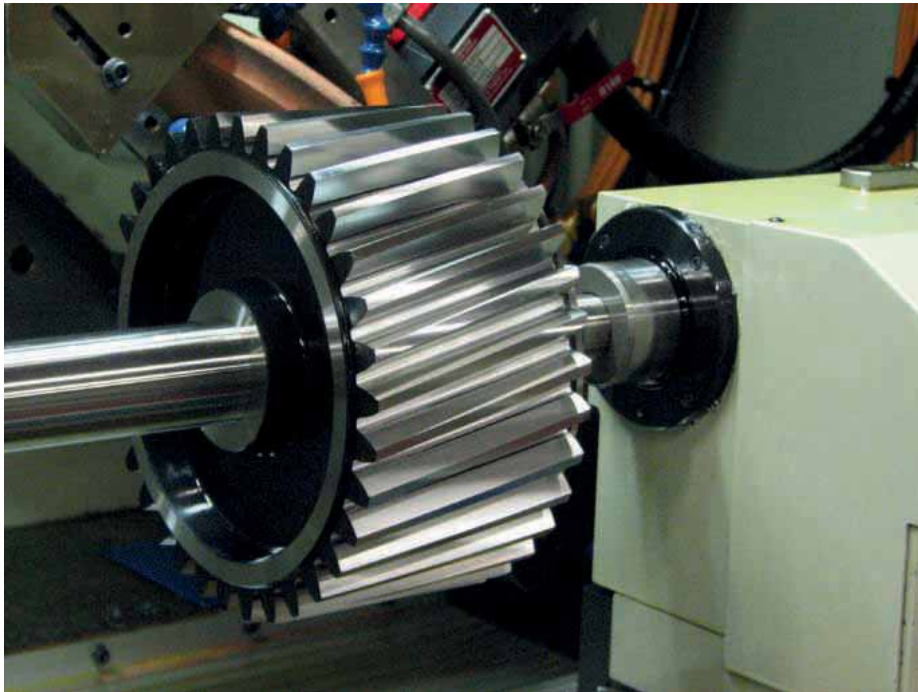
Helical twist is a condition that occurs when helical gears are 'lead crowned' to improve meshing and to reduce noise and wear. Lead crowning varies the amount of material



Above and below: In-process verification







Precision grinding of a large face width pinion gear

removed from the flank of a tooth across the face width, by causing the tool motion to deviate from a true helix. The problem, however, is that 'in form' grinding has the undesirable effect of causing the profile of the tooth flank to vary across the face. In high precision and low noise applications in particular, this affects gear wheel performance by concentrating loads on certain areas of the gear teeth during meshing.

Holroyd's design engineers have ensured that the GT350 automatically corrects the problem of helical twist. This is achieved through the use of specially written, dedicated software that both calculates and controls additional motions of the grinding wheel during the grinding operation. During the machining process, the workpiece is rotated about its axis and the tool moved in order to vary the angle of inclination of its axis relative to the axis of the workpiece. As a result, generated errors are reduced along each line of instantaneous contact between

the tool envelope and groove surface being machined. The result is better tooth contact during meshing and improvements in torque transfer efficiency.

## Holroyd Profile Management System (HPMS)

Easy to programme, set up and use, the GT350 also features Holroyd's integrated Profile Management System for highly accurate profile grinding, and an advanced Touch Screen Interface which allows the operator to take a typical design drawing and enter the coordinates directly into the machine. By extracting data from the on-board Renishaw probing system, the GT350 can predict any minute alterations in the profile of the grinding wheel to achieve a precise result. Where a workpiece fails to meet tolerance requirements after a first grinding pass, the machine calculates the adjustments needed to the grinding wheel form or axis position, transmitting the data on to a 2-axis CNC wheel dressing system to achieve automatic, on-machine dressing of the grinding wheel, all to ensure precise and effective gear grinding. Typical applications include high-performance aerospace, automotive, precision motion, low noise and master gears.

## The Holroyd GT350 gear grinding centre, at a glance:

- Developed for prototyping, batch and volume production

- Automation and Industry 4.0-ready
- Machining process compensates for helical twist
- Extended machine bed for greater manufacturing capability
- Integrated profile management system
- Fully automatic programmable cycles
- Fully automatic grinding wheel balancing system
- 'On machine' component inspection
- Advanced in-process wheel dressing system

Grinding cycles are included for: spur gears; helical gears; crowned helical and spur gears with root or tip relief; worm gears of the form ZK, ZI, ZN and ZA; dual lead (duplex) worm gears; splines.



## PTG: The first name in precision

Incorporating the brands of Holroyd, PTG Powerstir Friction Stir Welding and Holroyd Precision Rotors, PTG has established itself at the forefront of high-precision machine tool design, build and supply for specialised applications. The range includes advanced machine tools for production of complex helical components such as compressor rotors, pump screws and high-accuracy gears, and Powerstir machine tools for friction stir welding advanced alloys used in transport applications. With production facilities in the UK, USA and China, Holroyd Precision Rotors manufactures the special purpose, ultra-precision helical components used in a wide range of industries, including refrigeration, air-conditioning, gas and vacuum pumping, industrial air handling, aerospace, medical equipment, motion control, power transmission, power generation, oil & gas, fluid transfer and high-end automotive. PTG also provides advanced technical consulting services.

## PTG Holroyd

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# Power, comfort and durability

Fuji's new 5-inch 1.9 hp grinder provides up to 1,000 hours between maintenance intervals

Fuji has launched a new high power 5-inch angle grinder that provides excellent durability in a compact size. The new FA-65 grinder delivers exceptional performance in heavy metal applications, enabling operators to increase productivity.

The FA-65 grinder provides 1.9 hp power and the governed motor maintains the rotational speed under challenging working conditions, so the tool delivers optimal performance. It has an exceptional power/size ratio and it ranked among the highest performing grinders in their class, which is typically only reserved for specialist tools.

"Such a high-power level is typically found in larger 7-inch grinders," says Clément Baylion, global product marketing manager at Fuji. "Through clever design we have been able to supply high power but without compromising on durability, and in a compact size to meet our customers' demands for high industrial-level performance."

The high power is handled by a heavy-duty bevel gear which has a long life and minimal service requirements; it can run for 1,000 hours without maintenance. As a result, operators can save time and costs associated with their maintenance regime.

The grinder's high performance is thanks to Fuji's gear cooling system, which helps minimise wear of the helical bevel gear and pinion. In the system, some exhaust air is passed through the gear, thereby lowering the temperature and enabling the tool to

last longer. It is also lubricated by air oil to withstand the high power. Furthermore, the grinder is robust with a full metal housing to protect the tool from the arduous environments found in metal working industries.

The FA-65 grinder is easy and convenient to use with a trigger that has been designed according to industrial applications, user habits and safety. Moreover, safety is also enhanced because the grinder supports proper disc installation. It features large flanges which help prevent disc breakage and an adaptable guard is secured with two screws.

The compact body means operators can benefit from excellent maneuverability and precision, helping to improve productivity even further.

The FA-65 grinder has adapted performance for industrial maintenance or for heavy metal applications such as those found in foundries, bridge and road construction, shipbuilding and railway industries.

### Save time with Fuji's new steel milling machine

Fuji has also launched the FRC-200S-1, an innovative mobile steel milling machine which cleans and removes weld seams up to three times faster than typical grinding practices. The new machine enables metal working operators to save significant amounts of time and associated costs with weld removal, so they can ultimately improve productivity.

Weld seams are usually cleaned using a grinder to remove weld beads. However, grinding them on large steel sheets is typically a tough and time-consuming process since the whole sheet needs to be worked on, not just the weld joint.

The new steel milling machine makes the job much easier and is more precise than grinding. The FRC-200S-1 is a precision cutting

tool and, after quickly setting the working depth, operators can remove the weld seam easily in one pass, rather than have to repeatedly 'scratch' the metal by grinding it, and without damaging the surrounding surface. This also reduces operator fatigue.

The FRC-200S-1 is powerful, with a governed motor of 1,000W at 4,200 rpm to deliver constant speed for maximum cutting speed. It is exceptionally easy to use; it features a large dial for establishing and adjusting cutting depth and once it is set up, the user simply has to push the tool with minimal effort. It is also extremely easy to guide. The machine features metal wheels with high quality ball bearings, a visual guide to centre the work and a roller guide to ensure only the seam is cut.

The milling machine is ergonomic and comfortable to hold with a natural handling position. It has large handles for controlled movements and is well balanced with the weight of the tool doing most of the work. Furthermore, the machine is easy to maintain and clean, since the metal chips can be removed simply.

For more information about Fuji Air Tools range of metal working equipment, contact:

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# A new lease of life for your STUDER machine with a machine overhaul

Anything that works as hard as a cylindrical grinding machine will wear out. This is particularly obvious in the geometry and precision. STUDER doesn't just support the customer in the purchase of new machines, it can also offer a complete machine overhaul. A STUDER machine overhaul at makes an old machine into one that is as good as new; in other words, a machine that has the same tolerances as when it was first delivered.

STUDER has been carrying out machine overhauls for 20 years. Every day, more than 25 employees are involved in giving machines and assemblies a new lease of life. Over 400 machines have been completely overhauled to date, as well as countless assemblies. Irrespective of whether machine or assembly, they all have one thing in common: an overhaul at STUDER is carried out by the original manufacturer with its unique knowledge and expertise, according to the same quality standards as for new machines. Ultimately, the customer gets a product whose quality and precision are comparable to that of a new machine.

### Trusted precision and quality

A machine overhaul fully restores the original precision and quality and verifies this by means of a certificate. Changing requirements such as reconfigurations, automation or even digitalisation can also be implemented in conjunction with the overhaul.

Thanks to the STUDER quality, the customer receives a new one-year warranty on the overhaul. This also includes ensuring



STUDER wheelhead before and after

parts availability again. As the machine is ultimately restored to the original condition, an overhaul provides the customer with an outstanding price/performance ratio compared to the former purchase price. STUDER can provide the customer with a specific loan machine for the duration of the machine overhaul if required.

A machine overhaul comprises:

- Machine base: completely overhauled, ribbed guideways milled, recast and repainted



- Control cabinet: replacement of wear parts in the electric cabinet
- Pneumatics: new valves, hoses and filters
- Hydraulics: new hydraulic and lubricating system, all new valves and hoses
- Workhead, wheelhead and tailstock: completely overhauled
- Axes: tables as new, installation of new recirculating ball screw and bearings
- Component casings: sand-blasted, repainted, colour according to STUDER design or customer requirement
- Control system: existing control system is retained
- Delivery: always with precise measurement of new machine tolerance including test certificates
- Loan machine: a loan machine can be provided on request
- Renewal of original CE certificate





# STUDER offers customers a wide variety of automation solutions

STUDER offers its customers a wide range of automation solutions. The Swiss grinding machine specialists give you an exciting insight into the world of automation; from the entry-level model to a customised solution, everything is offered and implemented.

The history of automation began when people at work started transporting bags and other goods from one place to another using human chains, rather instead of individually. One of the best-known forms of automation was invented by Henry Ford, with the assembly of complete vehicles on an assembly line in 1913.

STUDER offers its customers a wide range of automation solutions. Loaders are available in various price ranges. The more functionality the loader needs to offer, the more complex the loading model becomes.

## STUDER easyLoad as a suitable entry-level model

The entry-level models are characterised by solid craftsmanship. They primarily provide a low-cost option for feeding and removing the desired parts to and from the grinding machine.

For the machine types S33, S31, S22 and S41, a loader solution is offered in the shape of a portal loader system with V-gripper. The STUDER easyload loading system is suitable for shaft components up to a part length of 300 mm and a gripper diameter of 4 to 30 mm (max. interfering contour Ø 50 mm). It therefore covers most of the part

spectrum produced on these machines. The parts are supplied via a standardised, adjustable synchronised conveyor. The enclosure for the base module, which has been adapted to suit the machine design, enables safe and clean operation of the system.

## STUDER easyLoad for external and universal cylindrical grinding machines

In the automation mid-range, where there is still an emphasis on standardisation, STUDER also offers suitable solutions in collaboration with external suppliers. Additional functions such as deburring, brushing or re-measuring ground parts can be offered for automation systems in the mid-range. For example, Wenger Automation & Engineering AG, in addition to the WeStack cell, which is responsible for the automation per se, also offers the WeSpeed cell. As the name suggests, this automation solution ensures quicker loading and unloading of parts on STUDER cylindrical grinding machines. The WeFlex is the flexible all-rounder among the Wenger automation cells, because the replaceable gripper bodies enable changeover from shaft to chuck parts in a flash.

## WeStack and WeSpeed cells from Wenger Automation & Engineering AG.

As with cars, there are no upper limits for automation solutions. STUDER has implemented many different combinations of machines and technologies in the past



WeSpeed



WeStack

and will also endeavor to do so seamlessly in the future. Other additional functions, such as reading and marking codes on grinding parts as well as sorting them, pre- and re-measurement between grinding cycles and match grinding, are just a few of the options that can be offered.

## flexLoad - the loader from the USA

A strong trend towards automation is also evident in the USA. In response, UNITED Grinding North America has developed the flexLoad loading system. The flexLoad (the name stands for flexibility) features a six-axis robot, which can move into the machine on a seventh axis for workpiece changeover. The robot is currently available for the three STUDER models S33, S31 and S41 in the USA.

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STUDER easyLoad

# Pioneering spirit for rotor machining

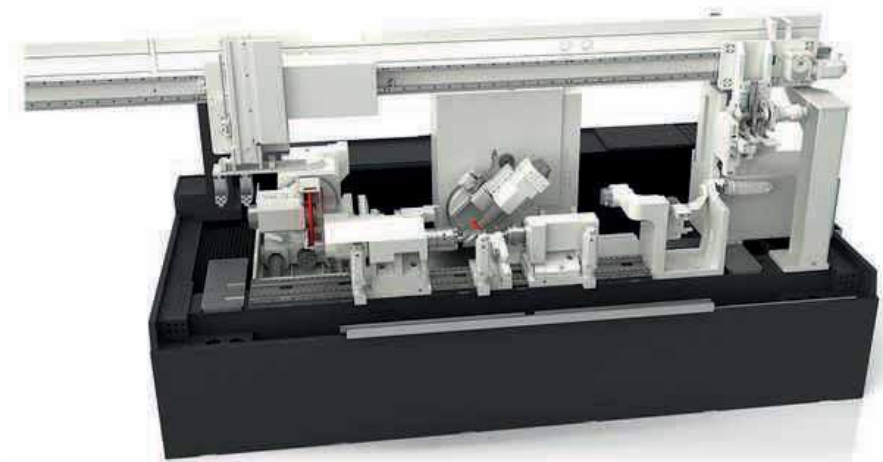
## Complete machining of rotors

JUNKER is demonstrating its pioneering spirit as the first grinding manufacturer to use complete machining in rotor production. The JUMAT 6L 40-30 grinding machine works on complex workpiece geometries for rotor pairs in profile and QUICKPOINT grinding in a single clamping process.

JUNKER combines the individual grinding steps for rotor pairs, whether pre-machined or casted, in a single machine. Complete grinding on the JUMAT 6L 40-30 shortens auxiliary process times, reduces the operating workload, improves quality and increases the efficiency of the end product. Air and gas compressors, expanders, vacuum and fluid pumps use the rotor pairs. The innovative JUMAT 6L 40-30 grinds rotors with a length from 200 to 650 mm and a swing diameter of up to 190 mm.

The rotor grinding machine processes and measures the workpieces and compensates for deviations from the nominal geometry, all in a single machine. The resulting repeat accuracy means that the rotor pairs are perfectly matched. The grinding operations comprise rough grinding the profile, grinding the outer diameter and faces using the QUICKPOINT process followed finishing the screw profile.

Subsequently brushing in the same clamping setup is an additional option. The wheelheads for the QUICKPOINT and profile grinding include an integrated, automatic, dynamic balancing system and gap elimination sensoric. The JUNKER quality hallmarks for which the company is known are also present in the new machine



concept in elements such as the sophisticated operating concept and highly stable machine bed.

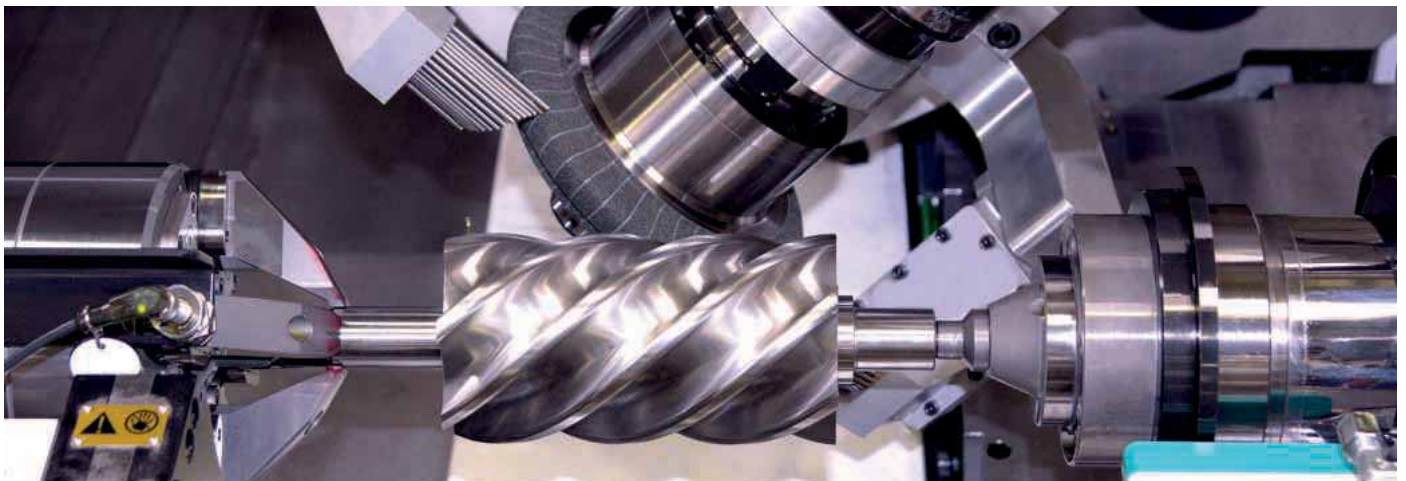
Thanks to the fully automatic tool changer with up to 20 different tools and inclusive, independent data management, the machine operator no longer needs to manually fit and remove the tools for profile grinding, including the associated cooling and rinsing nozzles, during the retooling process.

The machine concept comes equipped with a 3D scanning measuring process that determines corrections without the need for an external measuring machine and optimizes the machining parameters in a single work step. The result is a stable, enclosed in itself process that leads to significantly better grinding results with

current profile shape accuracies of  $\pm 3 \mu\text{m}$  in practice.

Furthermore, the machine can execute a range of simulations in advance, for example the dressing path and the corresponding diamond wheel geometry as well as the effect of changes to the grinding wheel profile on the workpiece.

Other rotor grinding machines measure the profile and gradient progression of an already-ground workpiece after the workpiece arrives at a measuring machine. The corrections are determined on the basis of the measurement protocol and then read in, so that the workpiece can be ground again. This process repeats until the desired result is achieved, a quite costly and time-consuming process which the JUNKER machine eliminates.





The new profile scan process by JUNKER, in contrast, makes it far quicker to perform the grinding, measuring and correcting steps in a single clamping process. In addition, users can save valuable time since the ceramic-bonded CBN grinding wheel is correspondingly dressed and the workpiece is ground again without requiring another clamping process. Scanning the gradient progressions directly in the machine makes it possible to compensate and correct for errors in concentricity, as well as infeed and outfeed of the screw profile.

The machine concept is rounded off by a

fully integrated, internal loading gantry, which takes on the task of workpiece handling within the machine and manages the part exchange between ground and unground parts outside the machine. The loading gantry can be changed over to a new workpiece configuration effortlessly using the quick-release interfaces.

The JUMAT 6L 40-30 delivers cost-effective complete grinding with highest accuracy.

Headquartered in Nordrach, Germany, the JUNKER Group is a world leader in the production of CBN high-speed grinding

machines. Close to 1,500 employees worldwide maintain the company's technological edge. Renowned automotive companies and their suppliers as well as tool manufacturers and other industries trust JUNKER's innovative grinding concepts. Whether for mass or small series production, JUNKER grinding machines operate precisely, economically and reliably.

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## Work smart with magnets

Eclipse Magnetics specialises in a variety of magnetic products under the heading "Work Smart with Magnets."

The high-performance range of solutions includes a variety of magnetic filtration products, as well as an extensive range of electromagnets, magnetic workshop tools, welding, handling, lifting, holding and retrieval applications.

Autofiltrex is Eclipse Magnetics' latest range of cost-effective, high performance automated filters with features including fully automated cleaning and a magnetic reclaim unit. Available in three different sizes, the Autofiltrex range is ideal for most ferrous machining applications such as grinding, honing, lapping, forming and quenching.

Eclipse's full range of high performance magnetic filters, which can significantly improve process efficiencies for precision metal finishing processes, includes the FiltraMag+ mobile unit, an off-line filtration system perfect for cleaning oils and coolants. Simple and versatile, it features

the high performance FiltraMag+ magnetic filter in a convenient "plug and play" unit, offering effective sub-micron filtration with the huge advantage that it can be moved easily from machine to machine.

Eclipse Magnetics' range of Workshop Tools is also available, which includes magnetic pick up devices, trays and swarf wands. The range also includes the world-famous Heritage range of magnets and pot magnets, as well as several new additions to the ever-increasing magnetic range including magnetic pick up and retrieval tools, and workshop products.

### Innovative magnetic solutions

With 100 years of experience in the design and manufacture of high-performance magnetic systems, Eclipse Magnetics supplies critical equipment to some of the leading names in the most demanding industries. Its magnetic technology is widely used at leading worldwide companies and in major development projects, all requiring a guarantee of equipment performance.



It has a track record of producing high quality products backed by a commitment to total customer service as well as a wealth of in-house manufacturing and value-adding finishing operations. Technical application teams also have considerable expertise in applied magnetic technology, thus ensuring most of the products are market leading innovations. All manufacturing is carried out under an ISO 9001 quality management system and appropriate industry directives.

**Eclipse Magnetics**

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# LACH DIAMANT innovation at AMB in Stuttgart

### DragonFly makes tooth-face grinding more efficient

The newly developed diamond grinding wheel for the tooth-face grinding of diamond grinding wheels provides supreme process reliability and stability.

LACH DIAMANT's DragonFly grinding wheels show supreme durability, stability and process reliability during continuous operation. This allows for reduced production and regrinding costs, while still providing highest precision.

The unique support system with 3-dimensional geometry and extended grinding layer allows the grinding of even the narrowest tooth pitch. It is possible to operate with higher speeds and infeeds. This shortens grinding time significantly and increases the cut volume. The results are impressive: exemplary straight surfaces without any deformations.

More information about DragonFly

diamond grinding wheels for the face, back and side grinding of carbide studded saws is available at AMB 2020 from LACH DIAMANT or in advance via email to [office@lach-diamant.de](mailto:office@lach-diamant.de).

### Diamond-coated wear parts in series manufacturing

For a long time, diamonds, preferably polycrystalline synthetic diamonds (PCD), have been proven superior to carbide in machining. However, why should diamonds as wear protection for tool and grinding machines be only available to a small, pro-active user group? Diamonds are not only a girl's best friend!

At AMB in Stuttgart, LACH DIAMANT presents many ways to use diamonds as wear protection and to profit from its superior hardness.

Examples include: centring tips, bezels, prisms as well as bearing shells, templates



Some examples of wear parts developed by LACH DIAMANT

and guide rulers, in addition to PCD-tipped knives for plastic granulates and diamond-coated guide elements for the paper and printing industries.

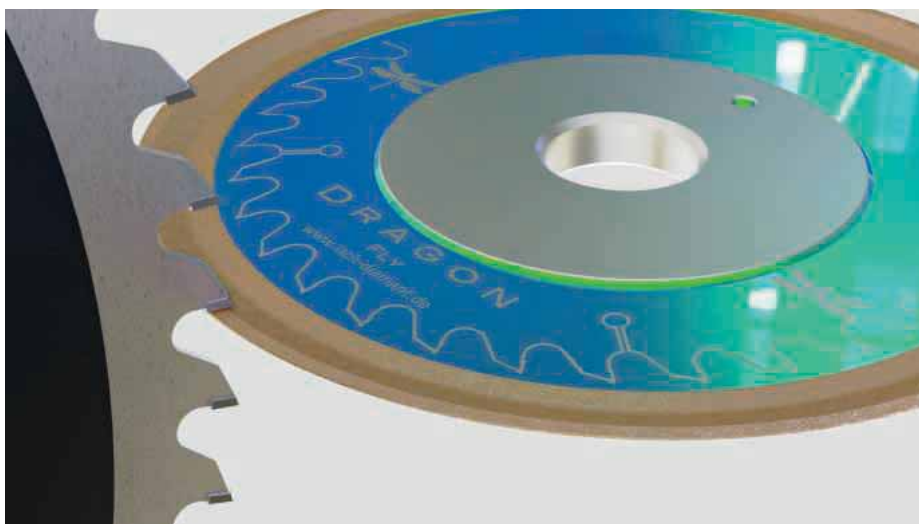
Talking to LACH DIAMANT will help to identify solutions which comply with your requirement for more cost-efficient production processes and less downtimes.

Jakob Lach laid the foundation for the present company in 1922. In the beginning, in Hanau, the city of precious jewellery, natural diamonds were cut into jewellery diamonds, called brilliants by up to 600 diamond cutters. In 1932 industrial diamonds and diamond tools were added, which, in 1950, finally replaced the jewellery diamonds.

Before the background of a modern industry, strengthened by new technologies, such as the development of synthetic diamonds, LACH DIAMANT became a worldwide leading manufacturer of diamond and CBN tools and a supplier of special machines for the manufacturing and sharpening of all polycrystalline diamond tools for the processing of aluminium and plastics (PCB, GRP, GFRP etc.) as well as all wood and wood-like materials.

For good reasons, LACH DIAMANT today is considered the pathfinder of indispensable pioneering work. The development of the company can be considered the "Who is who" in diamond and CBN tool manufacturing.

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The innovative DragonFly provides highest precision and stability during the machining of carbide-studded saws

| Operating Parameters |                              |
|----------------------|------------------------------|
| Cooling Lubricant    | Oil or synthetic             |
| Workpiece            | Carbide studded circular saw |
| Infeed               | $a_e$ = up to 0.3 mm         |
| Infeed Speed         | $v_f$ = up to 8 mm/s         |

Operating parameters for the efficient tooth-face grinding of carbide-studded circular saw blades



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\*3055rpm at 200mm diameter

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# Increased grinding efficiency and less bottlenecks

Hugely successful GENIS 2 product range by TYROLIT plays a heavy game with the evolution of lightweight vitrified-bonded grinding wheels

In the development of its original GENIS wheels, TYROLIT focused on the needs of vehicle engine and gearbox producers, with a view to increase grinding efficiency and eliminate production bottlenecks. The outcome was a new stronger vitrified bond that minimises the amount of bond material needed to hold the CBN grain. The effect of reducing the amount of bond, enabled TYROLIT to increase the wheel porosity, providing greater metal removal rates and allowing increased coolant to the cutting zone. The result was a dramatic improvement in wheel life, part quality and processing times, thanks to the wheels increased cutting ability. Dressing intervals could be doubled and cycle times reduced by 20 percent.

As with all good ideas, there was always room for improvement and combined with further development in bond and grain design. TYROLIT has now introduced a new "lightweight" wheel body, machined from steel, which pushes the boundaries of cylindrical grinding applications even further.

GENIS grinding wheels were already available with a variety of core materials including ultra-lightweight carbon fibre and



External cylindrical grinding of crankshafts with a GENIS 2 LW grinding wheel



A partially opened GENIS LW (wheels are always completely covered by steel plate)

aluminium. Although steel considered an inexpensive alternative, especially where the wheel is subject to heavier loading, there was always the negative effect of increased wheel weight. With the GENIS 2 LW product line, TYROLIT is a pioneer and technology leader in the area of lightweight vitrified-bonded grinding tools. Through targeted design changes, the wheel weight has been significantly reduced. The material removal rate at the core is not random but is calculated using a computational FEM analysis (Finite Element Method). An FEM design simulation has been used closely to guarantee the stability of the wheel during grinding. This means that any risks surrounding a reduction in strength and any potential performance losses can be eliminated. Through use of the lightweight GENIS 2 LW version, the maintenance intervals at the grinding machines can be reduced and wheel mounting significantly simplified.



## Weight reduction of up to 50 percent

Lightweight tools result in less wear on spindles and bearings, than comparable reference tools. Key benefits of this product can be seen during the transport and mounting of the tools. A patent has been applied for, with regards to this innovation. Some of the more notable benefits of weight reduction include: easier handling for people in the production; reduction of vibration during grinding- leads to a better grinding result; reduction in the maintenance of grinding machines and spindle bearings; reduction in setup times due to ease of handling.

The wheel receives special treatment and is precision-balanced before leaving the factory. This additional package is ideal for machines without an integrated balancing device, as here, tool-changing times are reduced significantly.

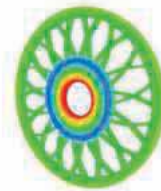
## Re-plating compatibility

GENIS 2 LW tools can be re-plated with ease, therefore the slightly higher purchase price of the core, can quickly be compensated. Additionally, the lightweight steel cores, are significantly cheaper than carbon fibre cores.

### Example application

Bearing-finishing of a large crankshaft  
GENIS 2 LW: 1000 x 52 x 202,94mm

Weight reduction of 55%



FEM simulation of a grinding wheel

## Re-plating compatibility

### Maximum tool life

Thanks to the weight reduction, another key benefit of this product would be the possible increase in tool life. A reduction in vibration would be just one example of how tool life of the GENIS 2 LW could be increased.

TYROLIT is one of the world's largest producers of grinding, cutting, drilling and dressing tools as well as machines for the construction industry. The family-owned company, founded in 1919 and a member of the Swarovski Group, is based in Schwaz, Austria, and currently has over 4,600 employees at 29 production locations in 12 countries and on five continents.

TYROLIT's Metal and Precision, Construction, Natural Stone, Ceramics,

Glass and Industrial Trade divisions produce around 80,000 different products. They are offered to customers all over the world by 36 sales companies and additional distributors in 65 countries. TYROLIT products grind, cut and drill almost any material of any hardness using advanced technology from Tyrol. The experts at TYROLIT are known throughout the world for mastering a wide variety of challenges and are much-sought-after partners in the development of new and innovative solutions.

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# Peitzmeier reaps the benefit of innovation

When Ulrich Peitzmeier sowed the seeds of his start-up business five years ago, he had little expectation of such a quick harvest from the risk and hard work that he put into the project. Peitzmeier Maschinenbau GmbH produces long-belt grinding machines for use in surface processing of stainless steel, steel and aluminium components across a wide range of industry sectors. In the UK, these machines are represented by deburring and surface finishing expert Ellesco.

"When I started the business it was just me. I was fortunate to have a 50 m<sup>2</sup> garage that I used as an assembly area for the initial machines. That lasted for two years before I had to upscale for the first time in 2017. A further move saw floorspace increase to 300 m<sup>2</sup>, but our plan is to double this in 2020 to be better able to manage the influx of orders that saw us working to full capacity in 2019," says Ulrich Peitzmeier. Employee numbers have also grown, with Ulrich now working alongside six colleagues who between them generated €1.4 m of turnover in 2019, a figure that will grow considerably this year.

For such a young business, export sales are a major element in its success, with almost 70 percent of its sales coming from markets outside of Germany, with the UK, Netherlands, Poland, Russia, Qatar, India and China all presenting good market



growth for the business. This growth is due in part to Ulrich Peitzmeier's previous experience in machine tool sales, but also down to the traditional methods still employed by many for surface and edge preparation.

"We find that between 80 to 90 percent of the people we speak to still remove edges when processing metal with an angle grinder by hand," he says. "This opens up so many opportunities to highlight the benefits of our machines and their automation of the

grinding and deburring process, eliminating time from the operation and also reducing risk to operators."

Deburring and polishing by hand is tiring work and brings with it its own health and safety issues. The result is that very few people want to do it, so automation had to be the way forward. By removing the bulk of human intervention in the process quality and consistency is also improved dramatically. This will increase further as more robotic systems become available, which is part of the Peitzmeier strategy. "In the world of high-quality consumer items, stainless steel cooker hoods for example, manufacturers attach great importance to this high level of consistency. We are seeing similar moves in the automotive sector also," says Ulrich Peitzmeier. "This is something that gives us great optimism for the future and will allow us to maintain a full order book."

One of the key advantages of Peitzmeier is its agility and ability to tailor machines to suit a customer's specific needs. The design of the Peitzmeier Omni-Grind machines is modular, a system that was developed from day one of the company's existence.

"Modularity is our unique selling point," says Ulrich Peitzmeier. "Because we had the advantage of starting with a blank piece of paper, from the beginning we opted for the modular system. Many of our competitors, on the other hand, had a history of manufacturing machines for the





woodworking industry and simply adapted their systems to the metalworking sector, creating compromises. Confirmation that our approach was correct came at the 2016 EuroBLECH trade fair, where the design was awarded an innovation prize.

For such a relatively small company, Peitzmeier provides a full service to customers from development and design, through to production and after-sales service. It keeps tight control on its supply base, with most components locally sourced. For example, the control system is manufactured in Verl, Peitzmeier's hometown, while spindle drives come from Bielefeld, and the motors from Lippischen, both less than an hour's drive away.



Focusing on quality rather than volume, Peitzmeier has just three machines in its portfolio, all of which can be adapted to suit. These are the Omni-Grind Twin, the Omni-Grind Portal and the Omni-Grind Dura, covering small to midsize, large and heavy parts and large heavy metal plate respectively. Each machine can be equipped with individual modules to match individual applications. Automation can also be tailored to suit a customer's requirements, with programmable five-face grinding possible. The rigid machine construction makes it possible to process parts measuring from 2 m to 12 m in width, depending on machine type.

Ellesco is the leading supplier of deburring, polishing and finishing machines in the UK & Ireland.

With over 40 years of experience and unparalleled expertise, it supplies machinery and its associated ancillary equipment to all sectors of industry. All processes are demonstrated in-house before you take delivery, or at the manufacturer if the job is more involved.

The company was founded in 1975 by Leonard Simonis, when he realised the potential for sheet metal deburring and finishing machines then newly invented by Machinefabriek van der Linden, since renamed Grindingmaster and now Timesavers, manufacturing on the original but much expanded site. Since Vincent Simonis took over the business in 1993, Ellesco has grown to supply complete deburring and finishing solutions for all manner of metalwork, flat or shaped, inside or out.

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# Abrasive nylon brushes boost machine shop quality and throughput

Delivering automated deburring and complete surface finishing of workpieces in a single online operation

One of the more noteworthy advancements in tools for in-line machine deburring, edge radiusing, cleaning and other surface finishing applications is the abrasive nylon brush. Now, with new advances in abrasive technology, machining centre operators are able to complete surface finishing simultaneously with other machining operations, to speed product completion, improve on quality and save on off-line finishing time and costs.

Abrasive nylon brushes are, for automated applications, densely bristled brushes composed of abrasive and flexible nylon filaments attached to a machine-mountable base. Each filament contains grit particles that provide machining actions such as deburring, cleaning, edge blending, polishing and other surface finishing functions.

Although there are a variety of sizes and shapes available, when configured for CNC or robotic applications, typically thousands of nylon filaments containing the appropriate grit are affixed in clusters to a single base that is mounted, for example via drive arbor, to the machining equipment.

Common applications for these tools include deburring, cleaning and rust removal, preparing surfaces for plating or painting, spot finishing, and polishing. Tools they commonly replace are grinders, polishing heads, chamfering tools, hand deburring and other equipment.

"The abrasive filaments work like 'flexible files,' conforming to workpiece contours, wiping and filing across part edges and surfaces to deliver maximum burr removal rates along with an ideal surface finish," says



Eric Sun, founder of Orange Vise Company, a machine shop and machine tool manufacturer located in Union City, California.

The quality abrasive nylon brushes are very durable and self-sharpening, providing excellent performance and wear life. Due to their linear filament construction, as these brushes come into contact with work surfaces during machining use, filament grit wears off, exposing new cutting particles. In that manner, the brush continues to be sharp. Also, unlike the bristles of metal brushes, the nylon fibers are not prone to deforming or breaking off.

"A problem with wire brushes is that the bristles tend to shoot out, they don't really stay put," explains Eric Sun. "When they bend, they often stay permanently deformed."

In fact, abrasive nylon fibres offer improved compliancy to the contours of even very complex workpieces, preventing damage while ensuring consistent finishing quality.

He notes that using abrasive nylon brushes can also eliminate the need to use other tools in automated applications, such as chamfer tools for deburring, and face mills for surface polishing.

"This tool is also applicable when tumbling would be required to achieve

extensive deburring," he adds. "While tumbling can certainly produce a nice surface finish, it can also create minor defects on parts because they come into contact with one another. Although it may take an extra minute or two to completely finish workpieces in the machine using the abrasive nylon brush technology, in my experience it is usually worth it in terms of quality and costs."

### Options available

Among a variety of abrasive nylon brush tools available, Eric Sun has adopted the NamPower™ line offered by Brush Research Manufacturing.

"We have two different patterns of these brushes. One is called the Dot-Type, while the other is called Turbine Type," he says. "We use the Dot Style for deburring highly contoured workpieces with a lot of peaks and valleys. It is particularly economical for light deburring operations when short cycle times are important."

He adds that the Turbine Style brush has a more aggressive pattern and is used mainly for medium and heavy deburring applications. This style of brush is better suited towards flatter workpieces with fewer contours and can be used to simulate a milled finish without actually removing any material.





Both these styles of abrasive nylon brushes are available in a variety of abrasive types and grit selections to work with materials including a wide range of metals, super alloys, plastics, advanced composites, metal matrix and ceramics. Both brush styles are available in three different diameters and two different trim lengths to suit most applications and can be used to automate processes on VMC, HMC, CNC and robotic applications, producing a consistent finish from part to part.

Composed of flexible abrasive nylon filaments bonded to a fibre reinforced thermoplastic base, NamPower abrasive disc brushes contain a unique combination of both ceramic and silicon carbide filaments. Although there are other abrasive nylon filament products that utilise silicon carbide or ceramic, it is the combination of both in one tool that makes this type of abrasive nylon brushes unique. The ceramic abrasive is engaged for material removal but tends to cut a bit coarse. The silicon carbide acts as a buffer to the cutting action. The end result is deburring and surface finishing in a single operation.

These brushes work well with non-ferrous, cast iron, mild steel and ductile iron, stainless and alloy steels, titanium and high nickel alloys.

"We weren't expecting to use brushes so much, but we're finding more and more uses for them," says Eric Sun. "We use the same brushes for aluminum, steel, cast iron and stainless steel without having to swap them out very often."

One such application, and one of its primary purposes, is for edge blending.

According to Eric Sun, Orange Vise utilises a variety of deburring tools, including a 45° chamfer. Although the tool doesn't typically leave a burr, when it begins to wear, even slightly, it can. Based on this possibility, Orange Vise required an employee to inspect each part and handle any burrs by hand. Now the company automatically deburrs chamfered holes and edges using the NamPower abrasive disc brush in addition to chamfering with a 45-degree milling cutter. The redundant operation of brushing adds minimal cycle time, improves surface finish, and ensures burr-free parts.

He adds that shops using CNC and other automated machining equipment can benefit significantly by adopting this type of abrasive brush technology.


"With this type of equipment working into the evenings and weekends, it's really desirable to get the finishing operations done straight out of the machine," he says. "While some shops run three shifts, if they have the personnel and the capacity they may still prefer to use their machines producing parts, not deburring. But for many operations, it's actually more efficient to let the machine do everything online, so that the part comes out ready to wash and box for delivery to the customer. That can really make a big difference, because you're using any unutilised machining hours, plus you're automatically producing parts with consistently high quality."

New developments are also on the horizon. Brush Research is set to release several new products featuring diamond and ceramic impregnated filaments. A new series of affordable diamond filament wheel brushes is designed to finish harder materials like ceramic and carbide. Several new end brush designs featuring ceramic filament will be available in smaller diameters to provide the benefits of abrasive nylon finishing and small parts and recesses.

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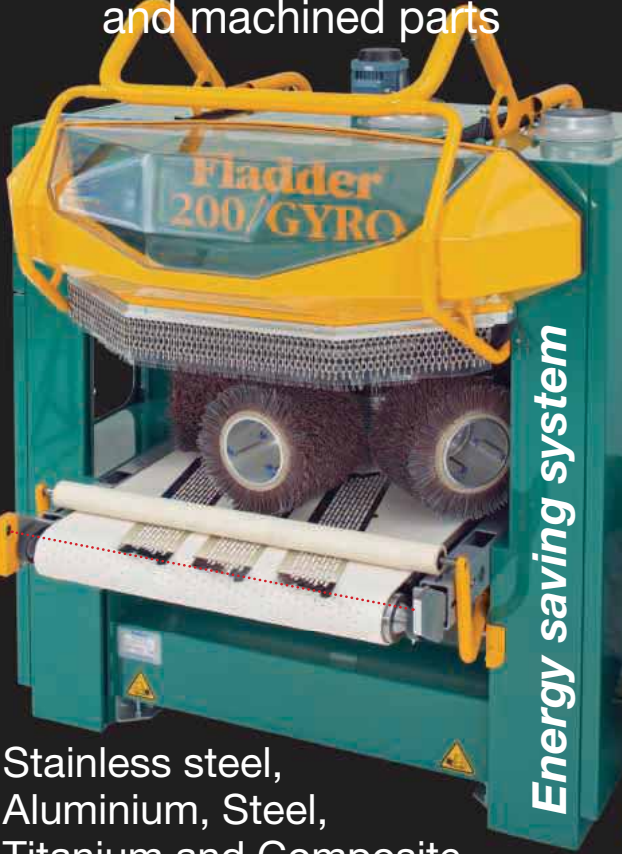
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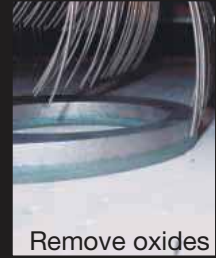
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# New polishing concept launched in the UK

ActOn Finishing has announced a partnership with Spanish firm GPAINNOVA as the exclusive UK distributor of DLYte finishing machines. DLYte machines are based on patented DryLyte technology for surface finishing of metal alloys.

The collaboration will enable the British manufacturing sector to achieve homogeneous results on surfaces and process complex geometries across a range of metals.

Sid Gulati, operations director at ActOn Finishing, says that the DLYte fits perfectly with their existing range of mass finishing products. "We have already added the DLYte 100I to our test lab so our clients can test the new technology.

"We are confident that through this partnership we can offer an advanced process solution and help our customers overcome challenges in finishing their components."

ActOn can now provide this technology to offer complete process solutions to the manufacturing sector as well supplying the dental, healthcare, aerospace, automotive and motorsport industries.

DLYte is a polishing system which is used for metal parts which require high performance or superior finishes. These include steel and stainless-steel, cobalt chrome, titanium, nickel and precious metal alloys.

It combines grinding and polishing in a one-step process to produce shiny finished parts. The DryLyte process is the first dry electropolishing system of its kind. It does not use any liquid as an electrolyte and is performed by ion transport using free solid



cnc inox socket joint before and after the finishing process



medical implant before and after the finishing process

bodies, suitable for steel, stainless steel, aluminium and titanium components.

This technology can be also used on machined, sintered and casting parts obtaining mirror finishing results. The process extracts the material only from the high peaks of the roughness, without changing the part's shape, tolerances or leaving any micro scratches on the surface.

The polishing action reaches every corner, so it can process inner cavities which cannot be accessed mechanically. Depending on the application, the process time can be reduced by around 75 percent.

Grinding and polishing of metal parts is an important process step for removing the defects in components, following the initial manufacturing process.

The removal of peaks, roughness, burs and micro-defects can dramatically improve the corrosion/oxidation resistance, lifespan and friction of a part. This is especially important for high-precision engineering applications such as those within the medical, automotive and aeronautics industries, where surface quality is essential.

The applications for DLYte finishing technology range from grinding, rounding

and deburring to surface smoothing and high gloss polishing of aesthetic parts.

The benefits of this technology include:

- The ability to process complex geometries without programming
- Allows for easy processing of channels and cavities.
- Fully automatic polishing to a mirror finish in one step.
- Increases resistance to corrosion.
- No contamination on the surface and no traces of hydrogen on the surface.
- Polishes homogeneously across surfaces without producing grinding patterns
- Avoids generating grinding texture patterns, improving wear and fracture resistance, and improving fatigue resistance
- Preserves initial shapes during polishing
- Reaches every corner of the piece which cannot be accessed mechanically
- Processes complex geometries without leaving micro-scratches on the surface
- Clean, non-hazardous and easy waste management.

Examples of parts well suited for finishing include dental skeletal, implants, surgical instruments, industrial moulds, dies, industrial precision parts, cutting, tools, engine parts, watch case, blisks, stators, blades, manifolds, brackets, guide vanes, bearings, gears, impellers, shafts, gears, bearings, joint balls, fuel injectors, brake parts and luxury inserts.

To learn more about ActOn's finishing technology visit

**[www.acton-finishing.co.uk](http://www.acton-finishing.co.uk)**.

For more information about GPAINNOVA visit **[www.gpainnova.com](http://www.gpainnova.com)**.



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## Kemet introduces surface finishing by dry electro-polishing

World leader in precision surface finishing, Kemet International Ltd now offers a non-abrasive, dry electro-polishing surface finishing system, capable of reducing surface roughness while maintaining the geometry and tolerances of the components.

Compared to the multiple steps often required with mechanical processing, this new technology offers fully automated polishing to a mirror finish in just one or two steps, depending on the starting surface.

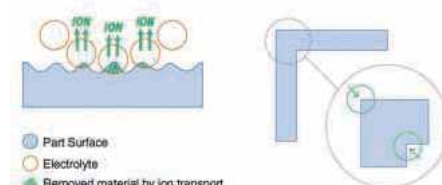
Dry electro-polishing offers an improvement on traditional finishing systems, simplifying the polishing process of metal parts with a new patented technology, surface finishing metals by ion transportation. The components are held by positively charged clamps and immersed in constantly moving media particles in a negatively charged container. Containing an electrolyte liquid, these conductive, porous particles absorb the metal being electrically removed from the peaks of the components' rough surface while maintaining component edge integrity and

penetrating/polishing internal areas that cannot be accessed by traditional methods.

The process is particularly suited to the medical sector where devices and components often require a high quality surface finish achieved using a non-aggressive process to avoid damage while maintaining compliance with the most demanding health and safety regulations, ensuring the parts meet all legislated requirements and enabling risk/benefit analysis of biocompatibility and toxicity.

Preserving the geometry of the component without rounding edges, dry electro-polishing can remove fine grinding marks to deliver brilliant, mirror-like finishes with predictable costs. It offers the ability to process complex geometries without leaving micro-scratches on the surface, while maintaining component tolerances.

A range of machines are available to cater for a wide variety of component sizes and quantities, as well as electrolytes for most common metals and alloys, such as cobalt chrome, stainless steel, carbon steel, nickel alloys, copper alloys, titanium and Nitinol.



Kemet welcome calls from customers to discuss how the process might work for their components and discuss trial processing.

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# New robotic sanding solution

The world's first patent pending Automated Industrial Programme was due to be launched globally by Mirka in April 2020, spearheaded by the Mirka AIROS, an innovative, electric Automated Industrial Random Orbital Sander, which integrates with OEMs' robotic systems to carry out intensive, high work load sanding, where precision and minimal maintenance is critical.

The launch of Mirka's Automated Industrial Programme marks years of development in partnership with major vehicle manufacturers in the automotive and transport industries. They requested the abrasive specialist's assistance in evolving its technology to provide a more advanced electric sanding head that is optimised for robots being used in a variety of applications such as the manufacture of vehicles and Tier 1 components and is currently being piloted by a range of industry sectors.

The Mirka Automated Industrial Programme comprises the hardware and consumables required to provide a robotic solution for customers, including the AIROS dedicated sanding head and a wide range of abrasives, enhanced by 75 years of Mirka's technical knowledge, research and development and experience in the abrasives industry.



Mats Bystedt, portfolio manager at Mirka, says: "We are seeing the increasing usage of robots for improving cost-effective production. Our advanced Automated Industrial Programme can be integrated into the two different categories of robot, from the simple to programme and growing cobot collaborative robot to the more industrial robot models, and installed very easily, without requiring special tooling, to provide total control over the RPM and steering, not possible with the pneumatic

tools usually used leading to 'over sanding' in sensitive areas. Our solution ensures measurement and precision are paramount, providing consistent quality and process optimisation.

"AIROS is the only specially designed, most compact, lightweight sanding head available on the market that can cater for virtually all robotic systems. The pilot customers we have developed this programme with have also said that it requires far less maintenance and replacement parts than previous products they were using. They are also impressed with the way the Mirka team integrates into the whole process in the factory, from the very early stages of the project setting up the parameters, to problem solving and final fine tuning of the sanding process."

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ARBOGA grinding and polishing machines are known worldwide for their high quality. The motors for the machines are manufactured in-house and are all continuously rated. This means that the machines can run continuously without any limits. Motor housing is either of cast aluminum or cast iron which make the machines very sturdy. The axle and bearings are of best quality and well balanced for a smooth run of machines. ARBOGA grinders and polishers are built for generations and supported with five years guarantee as standard.

The polishing machines are available with either polishing mops or polishing belts or a combination of the two options. The sizes of the polishing mops range from Ø200 mm to Ø450 mm and the polishing belts can either be 50 x 600 mm or 75 x 2,000 mm.

The belt arms can be placed in any position from vertical to horizontal position and ensure the best possible working position for the operator. Polishing on the belt can be on a direct on a rubber wheel or with flexibility for round parts.

For the polishing mops, ARBOGA offer either flange mounting or tapered spindles. The shaft on the polishing machines are extra-long for good distance to the motor housing and offer plenty of space for polishing. If the standard version is not giving enough space ARBOGA offer extended spindles which give extra distance to the motor housing. The guarding of the polishing mops is available in different versions for the optimal operation.

ARBOGA also offers polishing of pipe and tubes to mirror finish. ARBOGA 75 CG is a centreless polishing machine ideal for the manual polishing of pipe and tubes up to 1-1.5 m in length. For longer pipe and tube, ARBOGA offers the 75 CGC, which



automatically feeds and polishes long pipe and tubes up to a weight of 20 kg.

A clean working environment is important and here ARBOGA has different solutions for efficient extraction and filtration of the grinding and polishing dust.

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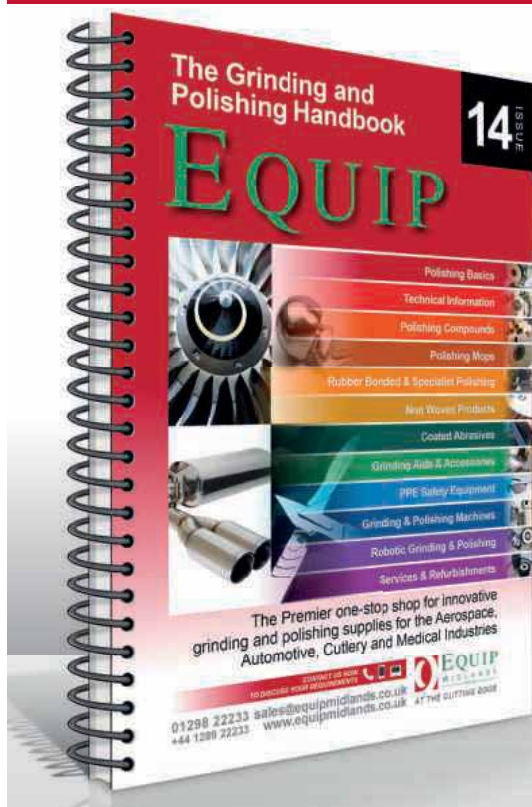
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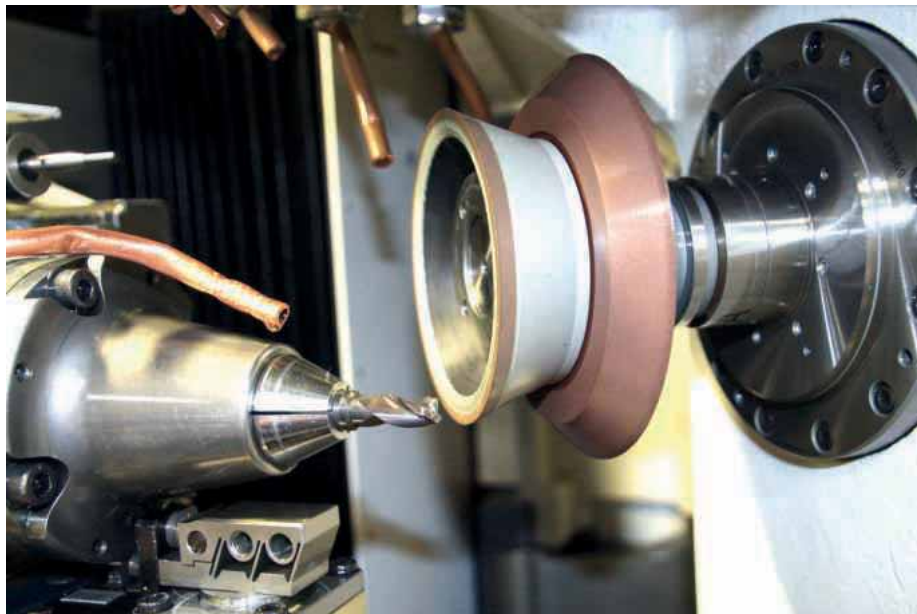


# Apex identifies growth through automated grinding

In the early 1990's, Niagara Tools, a small family-owned business regrinding hand-tools and producing HSS cutters was sold by an ageing Dave Milne to the next generation of owners; a step that eventually took the company from 3-4 employees in a small rental unit to a business with a turnover above US\$ 4m. Initially founded in the early 1970's, the company has undergone an unrecognisable transformation that is credit to a number of buy-outs down the years.

Within ten years of the first buy-out, the largely manual machine shop was filled with CNC tool and cutter grinding machines, with the innovative Vollmer Vgrind160 among the equipment added to the company plant list. Niagara Tool grew to a position that multiplied staffing levels, due to the incumbent owners making full utilisation of their automotive industry contacts. Down the years, the company invested in 'the latest and greatest' machines in the field. This has included CNC tool and cutter grinders, machining centres and turning centres from a range of suppliers for manufacturing everything from solid carbide and PCD cutting tools as well as steel tool bodies and indexable inserts.

When long term owner Paul Brodeur was



looking for an investor to take the business forward some five years ago, the Apex Tool Group recognised the robust foundations and consistent growth of the business and bought what is now known as Apex Cutting Tools.

The transition to becoming a member of a global group has seen Apex Cutting Tools expand its reach into the aerospace market, but with automotive Tier 1 suppliers as well

as GM and Chrysler nearby, the automotive industry remains a core focus. The growth of the company located near Niagara Falls now sees it undertake the processing of over 1,000 regrinds a week for a single customer. With an output of more than 10,000 carbide and PCD tools a month, the company also manufactures hundreds of steel tool bodies complete with indexable inserts every month.

Apex Cutting Tools produces more than 2,000 new PCD and solid carbide tools each month with more than 8,000 tools on a repeat cycle of re-grind, re-coat and re-supply to clients. This total output has more than doubled in the last 10 years. The output is significant and impressive, but more impressive is the fact that Apex Cutting Tools doesn't have standard product lines. Every tool is a special, manufactured to the specific demands of the end users. This makes production at Apex Cutting Tools far removed from the volume production market. To support this, the company operates two shifts and if machines can be loaded with a batch of tools for overnight production at the end of the second shift, they will be. This sees machines like the Vollmer Vgrind 160 running up to 24 hours a day.

CNC Grinding Department supervisor at Apex Cutting Tools, Stephan Rodrigue says: "The breakdown of our production is relatively equal between PCD and indexable tools with solid carbide being the majority of production. Our production volumes are





generally in the range of five to 50 tools with some runs occasionally reaching a few hundred tools. We have one customer that comes in on a Friday with 1,000 tools that have to be re-ground by the following Monday. We get all the loaders set up on the machines and the tools are reground automatically over the weekend and ready for delivery on Monday."

The company has a series of manually loaded CNC tool grinders, which are now reaching the end of their service life, something likely to be expedited by poor machine support and the arrival of automated machines like the Vollmer Vgrind 160. Stephan Rodrigue continues: "Just over two years ago, the company invested heavily in DMG Mori and Mazak machine tools for producing tool bodies, Zoller Genius tool measuring machines and a range of CNC tool and cutter grinders. We were invited to look at the Vollmer Vgrind 160 machine and as it was going to be our first Vollmer, we were somewhat apprehensive. Our opinion changed as soon as we looked closer at the Vollmer, we were really impressed. Now it's here, we're thoroughly impressed with it and we're already looking at a Vollmer erosion machine."

One of the key features that drew Apex Cutting Tools to the Vollmer Vgrind 160 was the CNC control platform: "The Vollmer has the Numroto Plus CNC software platform, which is a different control system to our older tool grinding machines. Numroto is now on most of our new machine acquisitions and the Numroto Plus platform is a must for us going forward. This is because it allows any program to be swapped between any of our new machines, regardless of machine brand. This gives us exceptional flexibility."



## Vollmer provides user-friendly interface

Two years after the Vollmer machine hit the shop floor, everyone is thoroughly impressed: "Everyone wants to run the Vollmer machine and everyone is fighting to get on the machine because it is easy to use and you can just walk up to it, hit go and you know the tools are going to be perfect. The layout, setup and interface are all easy-to-use and the Numroto and Vollmer interface is seamless and very simple with its touchscreen and keypad configuration. It has six basic buttons with a speed control and a stop-go function on the control – it couldn't be any easier. The machine just takes-off, does its thing and tells you if there is a problem."

The thousands of solid carbide tools are produced or reground on four automated CNC grinding machines and three ageing manually loaded machines. "As we produce tools with shank diameters from 3 mm up to 20 mm in 1 mm increments on the Vollmer, they were kind enough to give us the drawings to produce our own collection of auto-load pallets in our own machine shop. As standard, the HP160 pallet magazine can hold 272 tools with 3 mm shanks and for larger tools with 20 mm shanks, we can hold 54 tools. We also have a special collet in the spindle for doing tool shanks up to 25 mm and the machine has a steady rest to support the production of drills over 200 mm long. The HP160 with its two-pallet system works fantastically well and the tool capacity gives us long periods of automated production."

Of critical importance to the prolonged periods of unmanned running is the auto-change six-wheel pack that is stored ergonomically at the rear of the machine. Automatically, the wheels are measured in-cycle with a probe, dressed and/or changed depending upon the geometry of each tool. So, regardless of whether the HP160 is loaded with carbide blanks or re-grind tools, the Vgrind will undertake complete fluting, geometry generation or re-grinding to the exact program specifications.

## Configured for speed

"All our machines have different capacities and horsepower levels," explains Stephan

Rodrigue, "but in most cases the Vollmer gives us cycle time gains over our other machines. This is largely due to the vertically aligned spindle configuration on the Vgrind. For example, we will rough grind the flutes on the lower spindle and then do the finishing cycle on the top spindle. This instantly removes the constant wheel changes that are common on our other machines."

"The finishing wheel will undertake micron precision grinding with outstanding surface finishes whereas the rough grinding can really rip the material off. We are doing a 24 mm diameter tool at present with a 12 mm core diameter and the Vgrind will grind the flutes in a single pass. Compared to most of our other machines, this stock removal is well above their rates. The Vgrind is at least 30 percent faster at roughing than some of our older machines. This is impressive considering the machine has belt



driven spindles as opposed to the direct drive spindles on newer Vollmer machines.

"The extra rail at the top of the C-axis gives the axis support from the top and bottom and the whole thing can swing around and grind from two positions. The solidity of that whole system and the spindles Vollmer use creates a massive structure that comes in and really takes out the material."

"When it comes to surface finish, the Vollmer is definitely at the top of our machines. Depending upon the tool and the finishes required, I would put the high surface finish jobs on the Vollmer every time," he concludes.

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# When diamond becomes as soft as butter

SmartSharpening from Rollomatic yields sharply defined cutting edges

There is no harder substance than diamond and, as a CVD layer or PCD tip, it has become a virtually irreplaceable cutting material in many industries. Its hardness has always severely limited the geometric design possibilities for tools – until now. The LaserSmart 510 and the new SmartSharpening process from Rollomatic make it easy to create sharply defined cutting edges even on diamond-coated carbide tools.

The list of extremely abrasive materials is getting longer all the time: carbon-fibre reinforced plastic, glass-fibre reinforced plastic, graphite, composites, precious metals and nonferrous materials, and they all pose a real challenge for machinists. To make the required tools as durable as possible, extremely hard cutting materials such as PCD or CVD diamond are used. The challenge now for tool grinders is to further enhance the abrasion protection already achieved and so extend the service life, but at the same time ensure very sharply defined cutting edges to enable precision-machining of tricky materials.

Rollomatic, the grinding machine specialist from Le Landeron in Switzerland, is helping to make this a reality thanks to the LaserSmart 510 and a world first, the new SmartSharpening process.

### Precision sharpness makes all the difference

For some tool types, CVD diamond layers offer the best protection. Over time, however, the coating causes pronounced rounding of the cutting materials, which means that the tool is no longer as sharp as the application might require. In certain applications, sharp cutting edges are absolutely vital. "But only if the sharpening can be done in a practical, simple, production-ready and automated way," says Sven Peter, product manager Laser at Rollomatic.

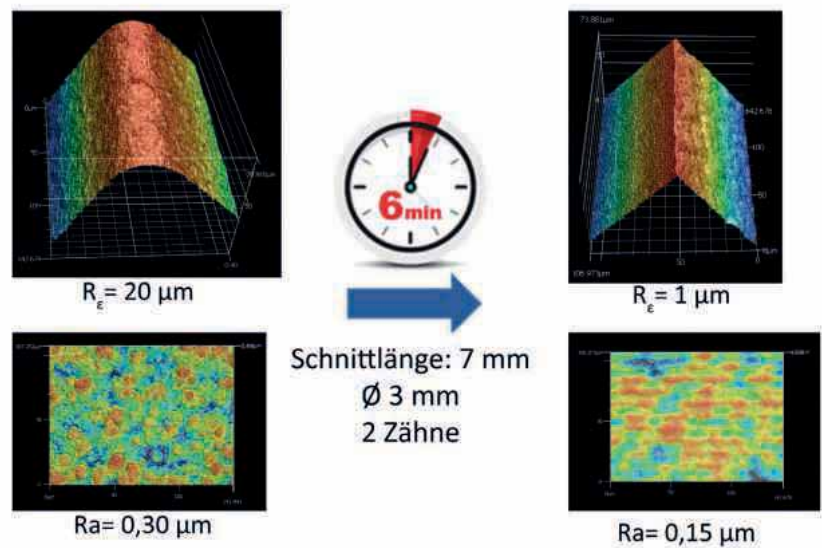
This is precisely where the LaserSmart 510 delivers. Rollomatic has developed a process allowing thick CVD coatings to be sharpened. The machine detects, to an accuracy within the  $\mu\text{m}$  range, the position of the coated cutting edge in order to determine its exact shape and position. "The laser then strips away just enough

coating material to give the cutting edge the desired sharpness. This means that the tool is sharp, but has not lost any of its protective layer," says Sven Peter. The fact that the sharpness of the cutting edges can also be corrected at a later stage in the process opens up whole new possibilities for manufacturers when designing their tools.

### Time as a success factor

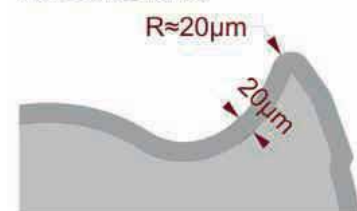
Production processes can never be performed fast enough, which is why users will love just how much time they can save with this new system. Compared to its predecessor the LaserSmart 501, the LaserSmart 510 shortens machining times by as much as 450 percent. "Especially compared with conventional production methods, this is a major step forward. When eroding or grinding metal, machining speeds of perhaps 1 mm/min can be achieved, our laser works at over 5 mm/min. This literally makes the conventional methods look old," says Sven Peter.

Of course, with potential speeds like these, you don't want to be let down by sluggish computing or programming times. This is why Rollomatic also employs the latest SmartMachining software, which allows sharp diamond tools to be designed extremely quickly and easily. "The program proposes, visualizes and monitors the

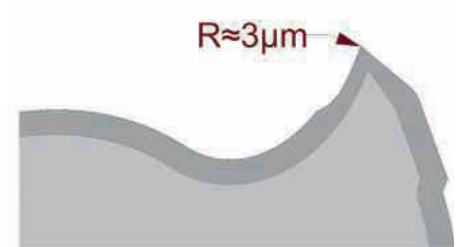


Cutting edge radius and surface roughness before and after machining with SmartSharpening on the LaserSmart 510 from Rollomatic

### Vor dem Schärfen



### Nach dem Schärfen



The SmartSharpening process with the LaserSmart 510 strips away just enough coating to ensure the sharpness and durability of the tool

optimum machining paths. This makes it easier even for less experienced users to do the programming, while at the same time allowing experienced users to make full use of the diverse range of features and functions available with our systems. And users of our first LaserSmart generation will also get to enjoy these benefits," says Sven Peter.

## Precision shaping of PCD

Another benefit of the LaserSmart 510, in addition to the ability to sharpen cutting edges, is that you can perform highly efficient PCD machining. This means that Rollomatic customers always have access to precisely the right technology for their application and can simultaneously operate their machinery at full capacity – all with the required flexibility. This makes the SmartSharpening process available with the LaserSmart 510 doubly attractive, both for manufacturers specialising exclusively in solid carbide tools and for companies that produce both carbide and PCD/CVD tools.

## New technology with the tried-and-trusted "chassis"

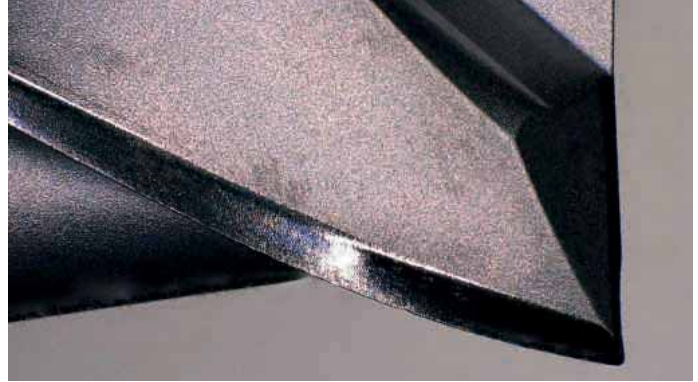
During the design and development process, Rollomatic drew on its decades of experience in grinding machine production. Here is why the LaserSmart 510 is such a highly sophisticated and reliable product:

Five interpolating axes with linear and servomotors form the basis for manufacturing indexable inserts and shank tools made of ultra-hard materials such as PCD, cBN, CVD, MKD or natural diamond.

Four built-in cameras monitor and map all the machine's processes on the control unit, from the robot to the measuring sensor. The tool measuring process, in particular, is much more efficient and user-friendly than ever before.

## A smart solution for tough jobs

Tools with thick-film CVD layers are designed to deliver outstanding performance in the machining of abrasive materials. SmartSharpening from Rollomatic is a straightforward and, above



The sharp cutting edge of a CVD-coated tool after laser treatment

all, quick process that enhances these tools by giving them extremely sharp cutting edges. Comparisons with conventional diamond tools show that tools with thick layers have a significantly longer service life. "This makes them a cost-effective alternative to the often much more expensive PCD variants," says Sven Peter.

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# Walter make a historic leap

## Cost-effective tool regrinding and erosion with new Raptor machines

Walter has announced two new entry-level machines for re-sharpening and manufacturing a wide range of carbide, PCD and HSS tooling in the most cost-effective way. The new Helitronic Raptor is targeted at carbide and HSS tooling up to 320 mm diameter and up to 280 mm long (including end face operations), while the 'two-in-one' eroding/grinding Helitronic Raptor Diamond is designed for PCD tools up to 400 mm diameter and 270 mm long (also end face operations).

Available from Walter Ewag UK, a member of the United Grinding Group, both machines are offered at attractive prices. Users can 'upgrade' the standard models with optional extras to suit their needs and budgets. Both machines can be configured with, for instance, a Top Loader (which accommodates up to 500 tools), glass scales, torque drive on the A-axis, wheel probe and manual support steady rest.

Targeted at the manufacturing of rotationally symmetrical tools, the 11.5 kW spindle Helitronic Raptor maintains Walter's renowned build principles based on the use of a low-vibration, solid grey cast iron gantry-type construction. It features the powerful yet user-friendly Helitronic Tool Studio 3 software with integrated Wizard technology for ease of use. This has a host of routines for 'what you see you can grind' fast tool production simulation, parameter changes and operation, the design and programming of complex tool geometries, including individual tooth geometries and tool parameter scaling, as well as fast 3-D live simulation routines. Also included is functionality for: cut-off operations, compensating for worn wheels; probing and alignment of asymmetrical flats, with more functionality to define probing points/probe the exact position for perfect alignment; automatic collision control.

In addition, Helitronic Tool Studio's software options embrace, for example: in-process wheel measurement inside the machine; core compensation for drills, core parameter and tolerance band; automatic machine axis referencing, using setting disc with electrical isolator; thread milling cutters, diameter/flank grinding and OD grinding.

Based on similar build principles, the 'two-in-one' Helitronic Raptor Diamond,



The new Walter Helitronic Raptor and Helitronic Raptor Diamond



Top Loader

which uses an HSK interface for electrode/grinding wheel mounting, also features an 11.5 kW spindle and its Helitronic Tool Studio software embraces integrated erosion functionality for the fast and easy programming of 'what you see you can grind and erode'.

The machine also boasts Fine Pulse Technology, a Walter innovation that sets new standards in terms of PCD tool surface and cutting-edge quality, as well as process reliability and speed of erosion. Fine Pulse Technology is the result of progressive improvements to the machines' generator as well as the erosion software.

With Fine Pulse Technology, there are marked differences to PCD tools of standard grain type that have been eroded by other machines. Indeed, the differences can be seen with the naked eye. The surface finish is



Top Loader during chucking

like that of a polished ground tool and even coarse-grained PCD types can be fine-finished with perfect surface qualities. This means that subsequent steps in production can be eliminated because no polishing is required.

With such super fine finishes, PCD tool providers can now achieve superb levels of tool surface quality and cutting edge within similar processing times as before but, with the Helitronic Raptor Diamond, at very cost-effective rates.

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## New extremely fast tool loading and unloading system

HAWEMA is offering a loading and unloading system with a unique granite design in one plane. The One-Way-System makes seamless process possible on the HAWEMAT 5-axis tool grinder.

A blank is loaded into the workpiece carrier via the supply magazine on a single conveyor. After the grinding process, the finished workpiece is picked up almost simultaneously by a robot removal system and the finished tool placed on pallets, reducing handing time to a minimum.

The blanks or other round or cross-sectional symmetrical workpieces are loaded through the workpiece carrier (C-axis). The insertion of the blank through the workpiece spindle of the C-axis during loading ensures high positioning accuracy of the blank via a 3D probe system.

The HAWEMAT WSA-G/10 tool grinding machine is designed for the production of high-precision shank tools (drilling and milling) in a diameter range up to a maximum of 10 mm. Due to the special properties of granite, temperature fluctuations are virtually eliminated, thus

achieving the best results in the grinding process.

HAWEMA attaches particular importance to high-quality machine components. The motor spindles, for example, operate with concentricity accuracies of less than 2 µm, while the precision guides are pre-stressed for maximum rigidity and accuracy as well as permanently lubricated. The worldwide patented kinematics with a double-bearing grinding column (Y- and B-axis) ensures rigidity and accuracy with exceptional free movement.

HAWEMA Kinematic is a new measuring system for determining the clamping length of the tool blank using a sensor (tool probe). This significantly reduces non-productive time.

The Numroto NUM-FLEXIUM control unit digitally controls the axis drives. NUMROTOplus is world leading user software that includes a Milling Cutter



Software Package for the manufacture of cylindrical and conical end mills with straight front, corner chamfer and full radius end mills. It also comprises a Drill Software Package for up to 19 different drill points, step drill with up to 10 steps and form step drills/cylindrical grinding. Profile Tools enables you to design all types of shank tool profiles. Customer support is available via internet connection and TeamViewer.

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# VOMAT fine filtration technology

Efficient, versatile and economical filtration of modern metal coolants

The new UBF vacuum belt filter from VOMAT combines amazing filtration capabilities with minimum space requirements.

In the ultra-fine filtration of water-soluble, fully synthetic coolants, emulsions or oils contaminated by sludge or chips, the use of a suitable filter system in industrial metalworking, such as tool grinding, turning and milling, is an important parameter for success. This is because ultra-fine filtration plays a key role in ensuring that the machining process produces high quality, is sustainable and economical, and keeps the wear on the installed coolant system components low. With the new UBF vacuum belt filter, filter manufacturer VOMAT is presenting a high-performance system that filters grinding residues, of metals and non-ferrous alloys, from a wide variety of lubricants and coolants.

VOMAT systems are ideal for the filtration of ultra-fine particles from oil and water-based coolants, such as those produced by grinding, turning, milling,

drilling, honing, lapping, eroding and other machining processes. VOMAT offers companies in the metalworking industry individually tailored concepts for the filtration of cooling lubricants in their machining processes, as well as special filtration solutions for a wide variety of materials based on their many years of experience.

With the UBF vacuum belt filter, VOMAT is now expanding its product portfolio with a new high-performance filtration system. The VOMAT UBF filters modern cooling lubricants and grinding oils to high purity standards combined with low operating costs and minimal space requirements, which is a great plus for the metal industry. VOMAT sales manager, Mike Groh says: "Our new UBF is truly versatile. It can be used for filtering various ferrous and non-ferrous alloys, hard metals, disc abrasives, binders, etc. without the need of a special pre-separation system. Depending on the material to be filtered and the

characteristics of the filter cake, the filter fineness is between 10 and 30 µm. If desired, a fine filter system can be installed downstream to further increase the filter fineness."

### Powerful and versatile

VOMAT offers the new vacuum belt filter in different volume flow capacities of 200 l/min to 2,000 l/min. During operation, a vacuum is generated and the system pumps suck the cooling lubricant to be cleaned through a high-performance filter belt and makes the cleaned medium continuously available to the process without interruption.

The disposal of machining sludge with low residual moisture is automatic via several filter belts. Moreover, the VOMAT UBF can efficiently filter larger chips, from turning or milling operations. The fully automatic belt cleaning system allows for user-friendly sludge disposal directly into transport containers provided by recycling companies. The integrated or external





cooling system can be cooled by means of a compressor or plant provided cold water. It has a control accuracy of  $\pm 1.0$  K and guarantees constant low fluid temperatures.

#### Remote maintenance made easy

An important advantage is VOMAT's low-maintenance technology concept. The VOMAT UBF is designed in such a way that a company's own maintenance personnel can easily service the machines on site at set intervals. Thanks to an integrated remote-control system, the UBF filtration system can be monitored via the Internet by VOMAT. This means a reduction of possible system failures through early detection. Mike Groh states: "If the worst comes to worst, VOMAT employees can trouble shoot the machine immediately after the occurrence without delay. In real-time communication with VOMAT staff in Germany, they are able to eliminate problems quickly."

#### Sustainable and compact

The high technical standard with regard to operational reliability and energy efficiency is reflected, among other things, in the use of frequency-controlled drives and pumps

as well as in design solutions for saving in energy-intensive processes such as vacuum generation. In addition, the UBF also scores with energy efficiency in cooling: VOMAT equips the UBF with chilled water or compressor cooling systems which have a much better coefficient of performance than conventional cooling systems with switch-on and switch-off thermostatic controls.

Mike Groh continues: "The compact UBF unit is extremely easy to maintain thanks to well thought-out design features. Due to a special belt guide, the vacuum belt filter, which can be used in a variety of filtration scenarios, requires about 70 percent less space than other systems on the market, while providing 100 percent performance. In comparison to the competition we have three times the filtration performance per square meter of production area. This is a significant cost benefit in times of expensive production space."

Whether it is the ultra-fine filtration of water-soluble, fully-synthetic coolants, emulsions or oils contaminated by sludge or



chips, VOMAT's new UBF vacuum belt filter is up to the task.

The new VOMAT UBF is truly versatile. It can be used for filtering various ferrous and non-ferrous alloys, hard metals, disc abrasives, binders, etc. without a pre-separation system.

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## Resin bonded filters for high viscosity applications

Porvair Filtration Group recently announced a new range of resin bonded filters for aggressive chemical applications.

Available in a broad range of micron sizes (1  $\mu$ m to 150  $\mu$ m), the Bonfil™ grooved cartridge filters are suitable for clarification and removal of gels and deformable agglomerates in applications such as organic chemicals, process water, coolants and adhesives.

The rigid phenolic resin structure ensures that Bonfil filters can withstand high viscosities and temperatures without deformation or collapse of the pores. This prevents the off-loading of captured particles, as the differential pressure rises across the filter. The castellated outer surface increases the effective surface area, thereby lowering the differential pressure and increasing the dirt holding capacity of the filter.

General manager, Mike Hughes says: "We are delighted to add the Bonfil family of products to our ever-growing range of cleanable and disposable cartridge filters.

We have seen significant demand for this product from our partners, distributors and clients, we are now very happy to meet that demand with a high quality high performing range of phenolic resin products."

Porvair Filtration Group is an international leader in the development and supply of high performance, innovative materials and solutions for applications in filtration and separation. Porvair manufactures in both the UK and USA and has an extensive network of sales offices and distribution channels throughout the world. Its expertise in a wide range of media and the dedication of its design, manufacturing, sales, test and research teams ensure it is at the forefront of filtration technology.

For over 50 years, Porvair has delivered world class performance to the most demanding of environments, including: OEM; aerospace and defence; food and beverage; gasification; microelectronics; nuclear; pharmaceutical; process; oil and gas.

The Group's ongoing success is based on



a dedication to technical excellence and superior customer service. In the future, it will continue to be built on its investment in research and development to provide innovative new products that exceed the expectations of its customers in solving the challenges they face.

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# Reliable part deburring, cleaning and drying on a 15-second cycle

EcoCvelox provides an innovative combination of high-pressure water jet deburring and low-pressure parts cleaning processes

As a cost-efficient answer to continually increasing demands on the absence of burrs and particulate cleanliness, Ecoclean has developed the EcoCvelox system. Its modular design allows a custom configuration and subsequent expansion, at any time, of equipment from a single source to provide a combined high-pressure deburring, cleaning and drying capability. Cycle times of only 15 seconds per pallet can thus be achieved. Further standard-setting features of the EcoCvelox system include a CAD/CAM interface for rapid and easy offline programming of the high-pressure deburring function plus highly dynamic part handling technology.

Hydraulic and pneumatic system components, engine blocks, pump and valve housings, nozzles, transmission parts, steering and brake elements and other, mechatronic components – these are just some examples of parts subject to ever more stringent specifications regarding deburring and technical cleanliness. Formerly, meeting both requirements in an optimum manner called for the use of equipment from diverse manufacturers.



The new EcoCvelox combines deburring, cleaning and drying processes with a highly dynamic and quick parts handling technology. This enables that these processes can be executed efficiently in one machine from a single source

Now, with its innovative EcoCvelox concept, Ecoclean GmbH has developed a modular solution that combines 5-axis high-pressure deburring with various part cleaning and drying processes in an efficient and space-saving manner. Moreover, in addition to flexibility, the new system sets standards in terms of the process-to-cycle-time ratio,

equipment level, operating convenience, ease of maintenance, and plant availability.

### Maximum flexibility makes for optimum adaptability to user needs

The modular design allows users to configure individual systems that merge high-pressure deburring, part cleaning and drying from a single source, and to expand them as needs evolve. A combination with other products from this machine manufacturer, for example solvent cleaning prior to deburring in applications involving high oil drag-in, is also possible. The diverse standard modules of the EcoCvelox are rated for parts measuring 200 x 200 x 200 mm, which are supplied on pallets. This format covers most general industry applications.

Tooling configuration for the various processes is likewise adaptable to the specific parts. Thus, high-pressure deburring can be performed using the standard single spindle at up to 1,000 bar pressure (or a maximum of 3,000 bar should the need arise). An optional HP turret accommodating up to five different tools supports complex deburring operations. It provides a tool-to-tool changeover time of only 1.5 seconds. The tools for the spindle and the HP turret can be custom designed



High pressure deburring can be performed using the standard single spindle or an optional HP turret accommodating up to five different tools. Cycle times of only 15 seconds per pallet can be realised

# Component Cleaning

to match the given part and can be made by 3D printing. For part cleaning, the processes of injection flood washing, spray cleaning and selective rinsing are available and can be combined. Drying can be achieved by high-velocity air blow-off and/or vacuum, with the air blowing solution being integrable into a cleaning module as well.

## CAD/CAM interface for easy programming of deburring operations

An absolute novelty in deburring systems, although a common feature on today's machine tools, is the CAD/CAM interface that can be integrated into the equipment. It allows a transfer of part design data for purposes of programming the high-pressure deburring step. This can be done offline to load the data into the machine controller, which is easier and faster than any conventional teach-in method. Moreover, this capability helps to set up deburring processes for new parts in minimum time and at low cost. For part identification, a camera system can be integrated. The result is an effective and cost-efficient deburring operation, even with 'lot size one' parts.

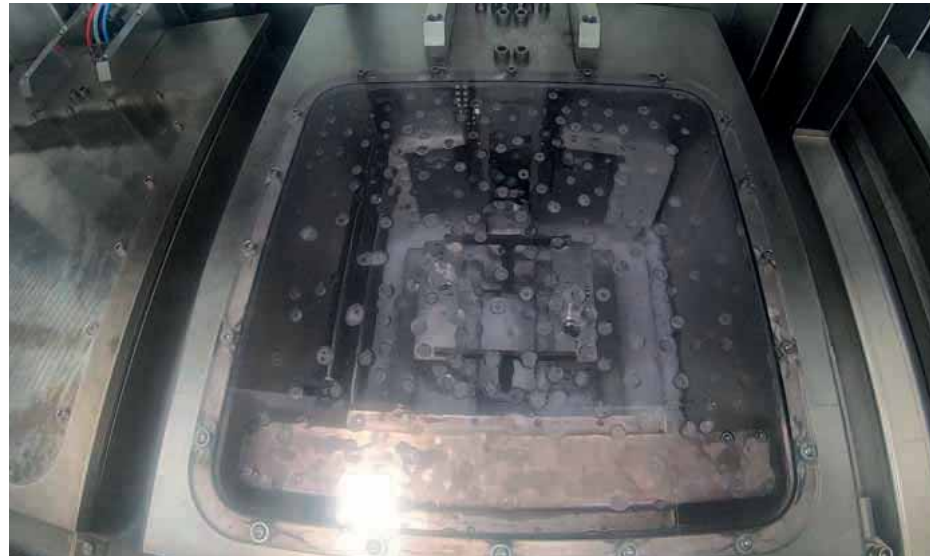
## 14.5 seconds process time in a 15-second cycle

Parts handling for the deburring process takes place in one Y-axis in the basic version. However, for high throughputs and the associated exacting cycle time requirements the module can be fitted with a second Y-axis. This allows loading and unloading to proceed in parallel with deburring. The process time, at 14.5 seconds, thus becomes almost equivalent to the 15-second cycle duration. The same can be achieved for the cleaning and drying module by integrating a second, concurrently operating work chamber.

Pallets are moved between the individual processing stations by means of a linear drive system integrated as standard that is characterised by its highly dynamic performance and wear-free motor. It conveys the parts from one station to the next at a speed of 4 to 5 m per second, thus contributing further to the system's operating efficiency. The loading process can be automated by means of a gantry system or robot.

## At least 50 percent increase in tool life

For process-inherent reasons, all tools used for deburring are subject to wear, which in turn results in a pressure drop. This means that tools need to be replaced after a certain



The workpieces are also cleaned and dried as single parts. For these processes injection flood washing, spray cleaning and selective rinsing as well as high-velocity air blow-off and/or vacuum drying are available

number of operating hours. On the new EcoCvelox, a patented software and a VFD-controlled high-pressure pump ensure that the process pressure is readjusted for this effect. This smart solution, providing a continual adaptation of the high-pressure level, extends tool life by at least 50 percent and thus boosts plant availability at the same time.

For a fast and efficient tool change, the deburring module has a lateral maintenance door. This provides easy access to both the lance of the single spindle and to the turret-mounted high-pressure tools.

## A smart solution for easy and effective operator control

Another feature contributing to the equipment's high process reliability and availability rates is its new intuitive operator guidance system. On the 19" flat screen monitor (HMI) all of the system's modules are presented separately and clearly in a complete overview diagram, similar to a smartphone display. If a problem occurs, this is indicated by a colour change of the affected module, e.g., to a shade of yellow or red. As the digital documentation is integrated into the HMI, it suffices to touch the image of the respective module briefly on the touch screen to view a process technology diagram, flow diagram or electrical circuit diagram in which all installed components are neatly shown, with the "malfunctioning" component (for example a pump) highlighted in a different colour. A detailed view of this item can in turn be pulled up at the touch of a finger. Various functions such as activating or

deactivating this component not merely support fast intuitive troubleshooting but also supply clear problem-solving information. Moreover, the lists of wear parts and spare parts featuring in the digital documentation will facilitate part ordering if necessary.

Due to its high flexibility in terms of both equipment configuration and process design, the EcoCvelox is an efficient, one-stop solution for all deburring, cleaning and drying needs. To avoid exhaust air, the system can optionally be equipped with an energy efficient air recirculation system.

The SBS Ecoclean Group develops, produces and markets forward-looking machinery, systems and services for industrial part cleaning and surface treatment applications. Its globally leading solutions help companies around the world in conducting efficient and sustainable manufacturing to high quality standards. The client base comes from the automotive industry and its suppliers in addition to a broad range of market sectors ranging from medical equipment, micro technology and precision devices through mechanical and optical engineering to power systems and aircraft industry. Ecoclean's success is based on innovation, cutting-edge technology, sustainability, closeness to the customer, diversity and respect. The Group employs a workforce of about 900 people at its twelve sites in nine countries worldwide.

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# Solutions for new and changed cleaning tasks

The extraordinary and unpredictable situation caused by the Coronavirus presents unprecedented challenges to companies worldwide. Industrial cleaning technology does not seem to play a role here at first and yet the solutions presented at this year's parts2clean will support companies from the production and remanufacturing sectors in improving their future viability and thus emerge from the crisis stronger.

Home/office, meetings via video conference, or remote service; the Corona crisis has been causing profound changes in many areas of working life worldwide, even where this was previously considered impossible. "The flexibilisation, virtualisation and digitalisation of work processes made necessary by Corona is also leading to changes in industrial parts cleaning," says Olaf Daebler, global director parts2clean at Deutsche Messe AG. "Many suppliers have been creative in finding solutions in order to eliminate user problems and provide support without having to be on-site."

The pandemic can become an accelerator for the use of new technologies and processes for the changes which were already emerging in many branches and markets before the crisis. Due to its huge impact on quality, functionality and manufacturing costs of products, industrial parts and surface cleaning is also an enabler for optimising manufacturing processes and make them more efficient. Additionally,



sufficient parts cleanliness is an essential prerequisite for using innovative manufacturing, joining and coating technologies as well as for implementing new products successfully.

"The cross-industry and cross-material offerings at parts2clean make it an ideal information and procurement platform for the manufacturing step component cleaning," says Olaf Daebler. The 18th edition of the leading international trade fair for industrial parts and surface cleaning will take place at Stuttgart Exhibition Centre, Germany from 27 to 29 October 2020.

### Solutions and trends for all industries

Whether plant and process engineering, media, cleanliness control or automation and digitalisation of cleaning processes, all relevant suppliers from the various segments of cleaning technology will be on-site, including the market and technology leaders. They traditionally present their new and further developments at the leading international trade fair, covering the versatile and demanding cleaning tasks in general industry and remanufacturing.

The range of products in this area includes robust and reliable individual systems for intermediate and final cleaning as well as fully automated cleaning systems for highest demands on cleanliness and flexibility, integrable in interlinked production environments, and expandable as required. For electronic and already assembled parts, there is a notable trend towards dry cleaning technologies.

When it comes to fulfilling very high particulate, organic and/or inorganic or biological cleanliness requirements, visitors can expect new cleaning and drying processes for wet chemical cleaning, as well as new and optimised alternative cleaning solutions like plasma, laser and CO<sub>2</sub> snow-jet cleaning. Among others, the focus will be on applications from the semiconductor supply industry, medical technology, optics, precision engineering, sensor and laser



technology, and the coating industry. The automotive industry is also in great demand for new cleaning solutions. Additionally, to the previously dominant particulate cleanliness requirements, film-like contaminants are increasingly coming into focus in the automotive.

The reasons for this are new manufacturing and production processes, the continuing increase in lightweight construction and technical developments in

drive technology such as battery-based electric drives, fuel cells, hybrid vehicles and the use of so-called E-Fuels. On the other hand, the topic of autonomous driving also plays a role. More than in other industrial sectors, cleaning technologies for the targeted cleaning of functional surfaces, such as adhesive and laser welding areas, are therefore becoming increasingly important in the automotive and supplier industry. A further aspect is the requirements resulting from interlinking and digitalisation with regard to communication capability and flexibility.

#### Transfer of knowledge: parts2clean expert forum

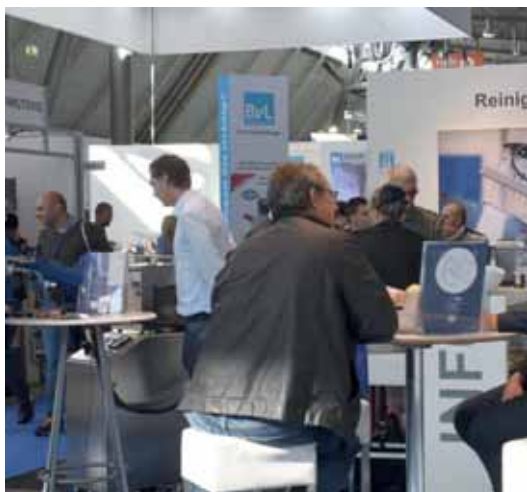
"Among the highlights of the fair are the simultaneously translated lectures (German/English) of the three-day expert forum," says Olaf Daebler. The meeting point for knowledge, organised jointly with the Fraunhofer Cleaning Technology Alliance and the Industrial Parts Cleaning Association (FiT), enables

visitors to obtain specific information about solutions, innovations and trends in industrial parts and surface cleaning.

#### Parallel event: SurfaceTechnology GERMANY

SurfaceTechnology GERMANY will be held concurrently to parts2clean this year. The international trade fair covers the entire spectrum of surface technology. "With parts and surface cleaning, parts2clean practically dedicates itself to an important production step upstream of coating," says Olaf Daebler. "As a result, there are good synergy effects between the two trade fairs, which are of interest to many visitors." parts2clean and SurfaceTechnology GERMANY will be located in the neighboring Halls 7 and 9 at the Stuttgart Exhibition Centre.

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## MicroCare offers new surface cleaners amid Coronavirus outbreak

As the world sees the Coronavirus (COVID-19) have a greater impact on the availability of traditional cleaning products used in the manufacturing process, many industries are looking for ways to effectively clean their products and workplaces. In response to those customer requests, MicroCare is expanding its line of surface cleaners in Europe. The purpose is to provide customers with reliable and effective fluids to keep surfaces clean.

"The Coronavirus outbreak led us to evaluate our product line and to identify those products that can be helpful to our customers," says Scott Wells, MicroCare general manager for Europe. "We have a new product that is ideal for cleaning surfaces."

The new MultiClean™ MultiTask Surface Cleaner Spray provides safe and high purity cleaning in almost any production environment. It effectively cleans a variety of working surfaces including tables, tools, machinery, gauges, keyboards, mobile phones and more. It features a 70 percent high purity IPA (Isopropyl Alcohol) and 30 percent D.I. (Deionized) water mixture that evaporates more slowly, allowing the

cleaning fluid to remain on surfaces longer, for better cleaning.

The new aerosol spray cleaner removes flux and white residue from circuit boards, solder paste and uncured epoxy residues from stencils, fingerprints, grease and light oils commonly found in medical device and electronics manufacturing. With excellent materials compatibility, it is safe to use on a variety of metals and plastics.

"When used with MicroCare General Purpose Wipes or Stencil Wipes, the new MultiClean MultiTask Surface Cleaner provides an effective way to help keep manufactured product and facilities clean," concludes Scott Wells.

MultiClean MultiTask Surface Cleaner is manufactured by MicroCare in the UK, facilitating faster delivery to all users throughout Europe.

Since 1983, MicroCare has been the leading manufacturer of cost-effective, environmentally progressive products for precision cleaning, coating and lubrication. These products are supplied to a wide variety of industries, such as electronics, metal finishing, transportation, photonics, medical devices and aerospace with a goal



of helping clients improve their own products, their quality and their processes. MicroCare also features an on-site critical cleaning lab and a team of experienced field technicians to help companies to use these products properly, safely and economically.

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# RÖSLER offers part-on-part mass finishing

Create finishing results without the need for ceramic, plastic and other types of media

Mass finishing processes require pressure and constant rubbing to achieve the desired finishing results. In most cases, these applications require media specifically selected for its material, size, and shape to act upon components and achieve the required effects. Some mass finishing applications also seek to eliminate or reduce part-on-part impingement or contact to protect delicate and high-value components.

Alternatively, part-on-part mass finishing intentionally exposes components to impingement and encourages contact between components and the resulting pressure to create finishing results without the need for ceramic, plastic, and other types of media. The only additives required for such part-on-part finishing are water and the respective compounds.

Rösler designs part-on-part mass finishing machines, known as WTA machines, which help reduce cost per piece through the elimination of media consumption and faster processing times.

### Many applications

Part-on-part finishing is ideal for small, bulk parts that are made of brass, steel, aluminum, and even small ceramic components.

WTA Systems are utilised for processing of parts ranging in size from 0.3 mm up to approximately 100 mm. Successful applications include the degreasing, deburring and cleaning of zipper parts,

brazing and welding contacts, hooks and eyes, buttons, small spindles and shafts, rivets, bushings, screws, disks, springs, pins, ammunition cartridge components including blanks and cups for casings, deep drawn casings, bullets, and primers.

### Finishing processes

With the right compound(s) and suitable dosing system, part-on-part finishing machines can handle nearly any type of surface finishing process:

In order to remove dirt, grease, or oil from the surface of the component, a pH neutral/slightly alkaline compound would be selected.

Pickling requires a highly acidic compound to remove oxidation and light scale left over from annealing, brazing, or welding.

Deburring, light edge breaking and removing sharp edges, such as those left by machining, is achieved with a pH neutral compound.

For surface grinding and smoothing a grinding paste is added to help smooth surfaces.

To create very smooth polished surfaces a polishing paste is added.

pH neutral compounds are selected to create bright, shiny surfaces.

For protection from oxidation and short-term resistance to corrosion, pH neutral and slightly alkaline compounds are effective, and oil compounds are chosen for long-term protection against corrosion.

By using several compounds, multiple tasks such as cleaning/degreasing, pickling, and drying or polishing, brightening and passivation can be combined into a single, fully automatic process.

### Operation benefits

In addition to the elimination of media costs and ability to use successive compounds and achieve various processes in a single machine, part-on-part mass finishing benefits include:

Compact, space-saving designs since no additional space is required for a separate dryer.

Simple material handling due to the elimination of component transfer between finishing machine and dryer.



Fully automatic operation with suitable component loading and unloading equipment.

No media issues such as lodging, chipping, or separation because no media is used.

Batch operation with complete machine unload, eliminating the risk of parts getting mixed up.

Different processing modes for different applications. Flow-through modes open drain valves allowing process liquid to flow straight through the machine. High water level modes close drain valves to retain process liquid in the machine.

Use of multiple types of compound in one single process including acidic, pH neutral, and alkaline compounds as well as grinding and polishing paste.

### Standard machinery

Rösler developed special WTA rotary vibrators especially for part-on-part processing that not only allow running the finishing/washing process, but also the subsequent drying stage in one single machine.

Besides WTA rotary vibrators, Rösler also offers centrifugal disk finishing machines that allow part-on-part cleaning/washing and drying in a single machine. Both machine types allow the complete unloading of a batch of finished parts to take place either by tilting the work bowl or by activating an unload gate in the bottom of the work bowl.

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# Robot loaded shot peening automation with traceability

Guyson International, the UK's foremost industrial finishing equipment manufacturer, has designed, manufactured and installed into an international manufacturing company, a large automated, robot loaded, dual media shot peening system for fatigue life enhancement, typically required in aerospace and medical applications.

The system comprises two Guyson Multiblast® RXS900 automated blast systems; one for steel shot peening and one for glass bead peening, with robotic work piece transfer between the two blast systems. The computer-controlled process was designed to meet AMS2432 standards demanded by the client. This fully integrated process with traceable record keeping delivered increased capacity with less labour compared to the existing process.

Batches of 12 workpieces in a dual indexing carousel for In/Out control are picked up one at a time by an ABB robot and sequenced through the system. Suitable for turbomachinery turbine blades or medical implants, each piece is loaded into the six rotary indexing stations of the Guyson RXS900 (Rotating indexSpindle) shot peening system located to its left. The components index clockwise through two shot peening stations, both equipped with two boron carbide blast nozzles, four in total, which vertically stroke up and down the workpiece, delivering the correct Almen intensity, at the correct impingement angle and providing 100 percent surface coverage.

Steel shot blast media is delivered to the blast nozzles via a 300 litre twin chamber pressure pot, allowing for continuous media flow during the long peening operation. To meet AMS2432 standards media flow rate is monitored and controlled with Magnavalves whilst closed loop peening air pressure, spindle RPM and vertical gun traverse rates are all held within tight specifications. An airwash station, separated by an internal pneumatic vertical door, removes residual dust and blast media from the components prior to removal from the blast machine.

Due to the heavy weight of steel shot used in the peening process, a bucket elevator transfers the used blast media via



Large automated, robot loaded, twin blast machines, for shot peening turbomachinery turbine blades or medical implants

Archimedes type auger screw into the reclamation unit to maintain blast media quality. This unit comprises a 30" 3-deck sieve separator which removes any oversize particulates via the upper decks to a waste bin. Shot that is within size tolerance of the process is returned to the storage hopper via the lower deck. Any particulates deemed smaller than tolerance pass through the decks to a waste bin. An integrated spiral roundness classifier removes up to 10% of the blast media during the reclamation process and removes any mis-shapen shot, before returning good media to the system.

A large reverse jet pulse cleaning dust collection unit provides automated cleaning of the four filter elements during the operation of the blast system, this being particularly beneficial for continuous blast operations. The dust collector is fitted with secondary HEPA14 filter, back-flap valve and explosion relief valve.

Following steel shot peening a de-contamination glass bead peening operation is undertaken. The same ABB robot unloads each station as it exits and transfers components to the glass bead peening system, where bead peening takes place in a similar blast system but using glass bead.

The RXS900 glass bead peening system differs from the shot peening system by having a Guyson built cyclone reclaimer. This extracts everything from the base of the

blast cabinet and separates out re-usable blast media from the dust and debris created by the blast process. The lighter particulates being drawn off into the dust collection unit, the heavier blast media flows down the cyclone body and into the media reservoir position above the pressure pot ready for reuse.

On exiting the glass bead peening system, the robot transfers the processed components to the right-hand unloading carousel, ready for the operator to remove. The operator is not able to access the blast area as both it and the robot are encased in a safety enclosure fitted with fortress interlocks. Once both systems are fully loaded, a continuous production run of one part in and one part out follows.

At the completion of the batch set the unload carousel indexes, presenting the work pieces to the operator. Simultaneously for traceability, batch processing records are written to an SD card or network computer to document and record the status of each piece within the batch.

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# Steel mill tumble blast machine

The AGTOS standard program of steel mill tumble blast machines (Model MR) have filling volumes ranging from 180 to 1,550 litres.

The choice of machine depends on the volume and the batch weight of the work pieces to be blasted. In addition, other parameters such as workpiece geometry, material and temperature should be considered when selecting a tumble blast machine.

In the event that a standard model does not meet your surface preparation needs, AGTOS will develop a tailor-made blast machine concept for you. Its team of experts welcome your detailed questions and look forward to helping you.

## Operation

The loading device loads workpieces directly into the blast machine from containers, pallets or so-called charging baskets. The workpieces slide through the open loading door and onto the advancing caterpillar tread. The loader subsequently returns to its initial position. The blasting process begins after the loading door is automatically closed and locked. After the blasting period ends, the door opens automatically. The freshly blasted workpieces are removed in sequence by a take-off conveyor, or by emptying them directly into containers provided by the customer.

The blasting abrasive is continuously cleaned, recirculated and reused. An abrasive metering device feeds the cleaned abrasive from the abrasive storage bunker to the high-performance turbines.

A fan unit creates the partial vacuum necessary to maintain dust-free operation of the blasting unit. Extracted air is cleaned in a special filter unit.

## Capabilities and applications

The tumble blast principle has been recognised for decades as the most effective blasting process for removing sand, scale and burrs from heavy or sharp-edged mass production parts that require the robust steel mill design found in the AGTOS Model MR tumble blast machines. Mounting screws secure the machine's steel plates to links in the caterpillar tread. These links are then joined together with appropriate connecting elements. The tumbling motion of the mill ensures that workpieces are exposed to the abrasive stream during the entire blasting period.

Machines of this kind can be filled and emptied in a variety of ways: with an automated loading device and take-off conveyor, or with other equipment already integrated in the rest of the production line.

The AGTOS team can draw on an enormous wealth of experience in the development, construction, manufacturing and marketing of turbine-wheel shot blast equipment. State-of-the-art production facilities at the plant in Poland and a complete warehouse facility at its headquarters in Emsdetten provide a streamlined organisational structure and a high degree of team motivation make it possible for it to manufacture machines and blasting units with the same consistently high quality at an economical price.

AGTOS offers shotblast equipment, which is tailor-made for diverse requests, placing special emphasis on providing perfect service for its customers. This applies not only to the blasting equipment it manufactures, but also to other makes of equipment. The service program includes: spare parts; modernisation and performance enhancement; repair and maintenance; instruction and training.



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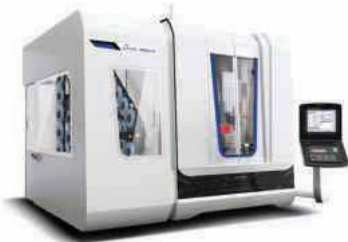
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